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How to build a rock cut

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HO switchers

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2 ways to build for operation

- David Barrow's all-new domino Santa Fe layout
- Visit a triple-deck helix layout with fold-up staging



HOW TO

- Build a feed mill from a photograph
- Make a distant treeline with a scuff pad
- Modify a steamer to match a prototype

Discarded Santa Fe traffic-control machinery inspired David Barrow's new HO layout. See page 52

PLUS

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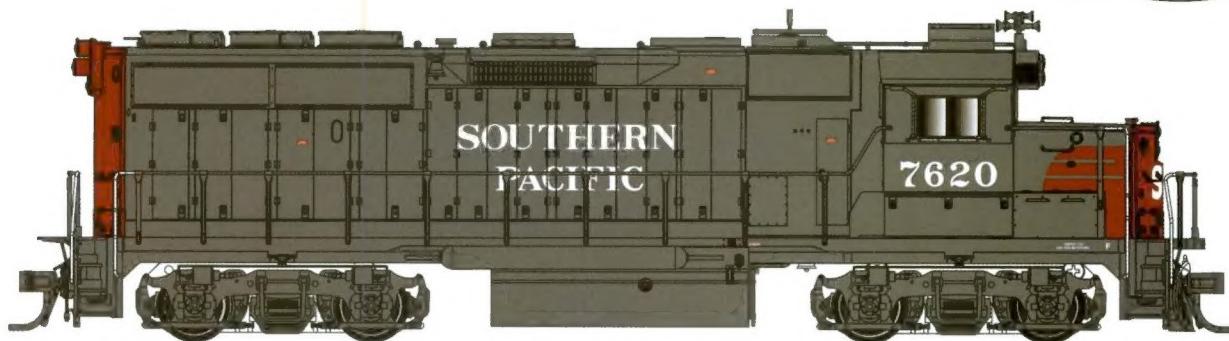
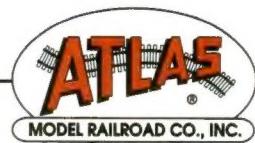


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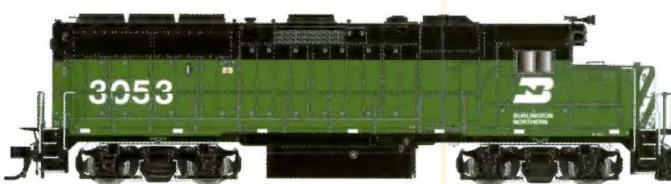
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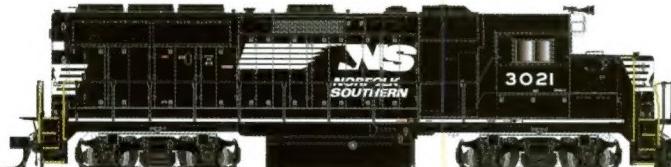
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Canadian Pacific - CP Multimark



Saskatchewan Grain - SKNX / SKPX[‡]

[‡]This paint scheme appeared only on the Hawker-Siddeley 4550 cf hopper



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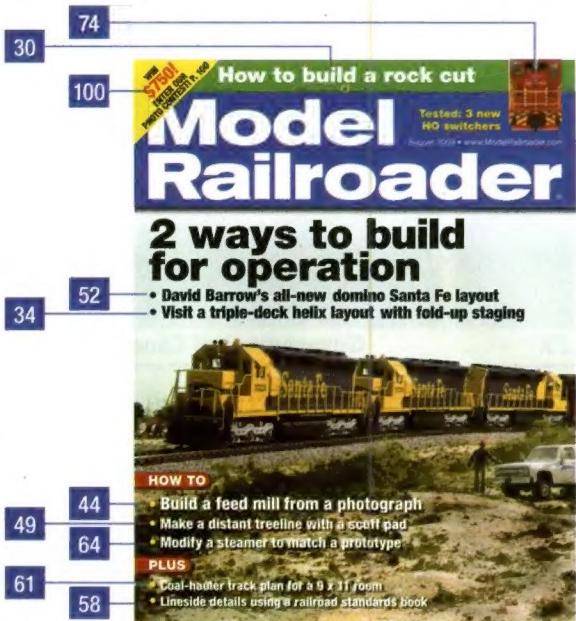
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Number 08



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Coming next issue: Pelle Søeborg, the master of modeling modern railroading, shares his tips on taking great layout photos. Pelle Søeborg photo

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RAPIDO

Pre-production samples shown. Most rivets not yet added. Roof lines still to be corrected.

From the Editor

The benefits of tinkering

Neil Besougloff, Editor

It's easy to tell who has last operated my son's N scale layout: just look at the locomotives. His layout is set in the Southwest in the 1930s, and by all rights, the line should be 100 percent steam. Nevertheless, he operates an A-B pair of Kato F3s almost exclusively. Why? He likes them.

When I take the throttle, I remove his F3s and put a Consolidation on the rails.

The 2-8-0 has added "tinkerer" to the job roster on his railroad.

The tinkering began when the Consolidation joined the fleet. It needed a full throttle to climb a grade other locomotives climbed easily. I re-read the 2002 *Model Railroader* review of the locomotive, which suggested loosening a gear-box cover plate for improved performance. It worked.

Next it was time to tinker with the pilot wheels.

Hours of inspection with an OptiVisor magnifier strapped to my head revealed that the wheels rode up the rails, every so often climbing over. Tinkering with the pilot frame helped, but the improvement wasn't enough.

My son stuck with his F3s and thought I was wasting my time. He said I looked goofy wearing the OptiVisor, but I carried on.

Next I took a closer look at the track. I repeatedly ran the locomotive through the trouble spots (with the magnifier again perched on my head), placing track shims in different spots.



The shims helped, but I achieved better results by filing track joints. Minuscule rough spots were tripping the pilot wheels.

A little more success; the Consolidation was almost there.

Lastly, I determined that turnouts just upstream from the derailments were setting up the locomotive for trouble. Using miniature files again, I carefully finessed the plastic guardrails. I tested other trains to make sure that my tinkering didn't fix the Consolidation at the expense of the rest of the fleet.

None of this was a one-evening project. I tinkered on and off for nearly a year.

Patience, determination, the ever-present magnifier, and careful filing ultimately paid off.

When the MR staff held its annual round-robin layout tour a few months ago, we ran the Consolidation. Most of you have experienced the corollary to Murphy's Law that states model trains will derail only in the presence of guests.

Much to our pleasure, the Consolidation disobeyed Murphy.

As for the F3s, my son still prefers diesels. But he observed first-hand the value of tinkering, patience, and miniature files. And more importantly, he has stopped mocking me when I wear an OptiVisor on my head.

NEIL BESOUGLOFF

► Contributing to *Model Railroader*

We welcome contributions from our readers, including articles, photographs, and prototype drawings. For detailed information on submitting material to MR, contact our editorial associate Eric Stelpflug at 262-796-8776, ext. 583, or mrrmag@mrrmag.com. *Model Railroader* assumes no responsibility for the safe return of unsolicited material. We assume unsolicited material is intended for publication by Kalmbach Publishing Co. unless otherwise noted. We assume letters, questions, news releases, and club news items are contributed gratis.

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Editorial offices

Phone: 262-796-8776
Fax: 262-796-1142
E-mail: mrrmag@mrrmag.com
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Advertising

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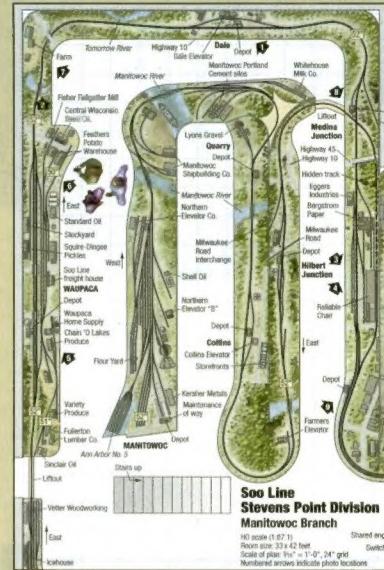
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Current subscribers can also download a printable copy of any tracking plan in the database onto their home computers.

You can find the Track Plan Database at ModelRailroader.com on the home page as well as under the Interactive tab.



Learn about Tony Koester's new layout



Watch this interview with Tony Koester, author of "Trains of Thought" as well as numerous model railroading books. In this exclusive Web video, Tony talks about the progress he's made on his new HO scale Nickel Plate Road. He also shares a few photos of the layout.



Guide to helix and staging design vol. 2

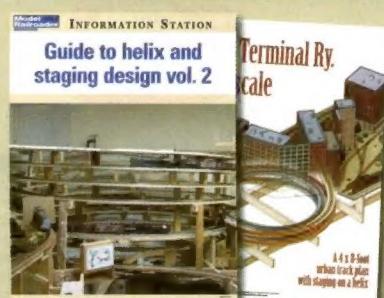
Download this collection of six articles on the oft-misunderstood helix and better behind-the-scenes operations. Visit the Web site at www.ModelRailroader.com/InfoStation.



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Layouts and layout building forums

Topic	Towed	Last Post	Replyes	Views
Cork roadster on fence?	46	06-20-2009 8:53 AM by Stratosphere	3	46
1968 Mustang EX track	82	06-20-2009 12:13 AM by Ricardo Rodriguez	8	82
Track ideas	80	06-20-2009 8:17 AM by Dadof6	1	80
station wagon, sedan, hard, or modified?	173	06-20-2009 8:58 AM by Dadof6	12	173
Tow More Levant Projects Plus To Share	316	06-20-2009 1:19 AM by euniceandjim	3	316
For a "classic" HC shell switching gears	1,300	06-20-2009 4:45 AM by LJ_1	29	1,300
Great West Models	228	06-20-2009 12:08 AM by Gwenster	7	228
Holding a Layout	232	06-20-2009 11:32 PM by Dadof6	2	232
Painting, contrasted kits	214	06-19-2009 11:28 PM by Dadof6	1	214

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News & Products



HO scale Electro-Motive Division SD60 diesels. These six-axle road diesels from Athearn are on hobby shop shelves now. In addition to the Oakway and EMD Leasing (ex-Burlington Northern patch) schemes shown above, the locomotives also

come painted for Norfolk Southern and Union Pacific. They feature prototype-specific details and McHenry magnetic knuckle couplers, and are Digital Command Control-ready with Quick Plugs. The ready-to-run locomotives cost \$109.98.

Hobby news

Club marks 60 years: Founded in 1949 in Elgin, Ill., the Valley Model Railroad Club is celebrating its 60th anniversary this year. Club vice president Warren Mette says that the club has been in its current location, the former Clintonville station of the Chicago, Aurora & Elgin interurban line, for more than 40 years. The club has public open houses at 8 p.m. on the second and fourth Fridays of every month. For more information, visit www.trainweb.org/vmrr/.

Athearn diesels to come with SoundTraxx Tsunami decoders:

Athearn announced that SoundTraxx's Tsunami Digital Command Control decoders will provide the sound for its HO scale Genesis locomotives, as well as sound-equipped Athearn N scale and Roundhouse locomotives announced after April 27.

Genesis is Athearn's high-end HO scale locomotive line, equipped with five-pole, skew-wound motors

and etched-metal details. Tsunami decoders include back-electro-motive-force control (back-EMF), dual-mode operation, and multiple lighting effects. A list of Tsunami-equipped locomotives is available at www.athearn.com.



MRC to distribute JTT trees:

JTT Scenery Products will be distributed and marketed in the United States and Mexico exclusively by Model Rectifier Corp., the companies announced. JTT makes scale trees from 1" to 18" tall in three series: Professional, Premium, and Super Scenic. The trees come with synthetic foliage and molded plastic, etched metal, or wire armatures.

JTT also makes other scenery products, including ground cover, grass mats, ballast, and field grass.

Edison, N.J.-based MRC makes and sells control systems for scale models, including model railroad power packs, throttles, sound systems, and Digital Command Control systems and decoders.

InterMountain, Red Caboose announce partnership: InterMountain Railway Co. announced an agreement to manufacture and distribute the Red Caboose line of assembled model railroad products, beginning May 1. The Red Caboose line includes freight cars in HO, N, and O scales, sold both as kits and ready-to-run. InterMountain will take reservations for Red Caboose items under InterMountain's current system and produce them based on demand. InterMountain will also distribute any Red Caboose items remaining in stock.

Fourth generation of Walthers family joins firm: Stacey Walthers Naffah has joined hobby manufacturer and distributor Wm. K. Walthers Inc. as consumer marketing manager. The great-grand-

12 ExactRail HO scale hi-cube boxcar, woodchip gondola, and auto rack

14 Assorted N scale freight cars from Micro-Trains Line Co.

14 Club offerings

16 LaBelle no. 105 Digital Command

Control track conditioner

16 Manufacturer listing

Steven Otte



daughter of company founder Bill Walther, Naffah is the first of the family's fourth generation to join the company. She has a master's degree from Northwestern University and has worked for ad agency J. Walter Thompson, as well as *People* and *Reader's Digest* magazines. Milwaukee-based Walther was founded in 1932.



HO scale locomotives

Electro-Motive Division SD70M and SD75M diesel locomotives.

Atchison, Topeka & Santa Fe (red-and-silver warbonnet); Burlington Northern Santa Fe (warbonnet patch); Southern Pacific; and Union Pacific ("Building America" flag scheme). Three road numbers available. Five-pole skew-wound motor with flywheels, working ditch lights, and magnetic knuckle couplers. \$149.98. October 2009. Genesis series. Athearn Trains

Alco RS-32 and RS-36 diesel locomotives.

New paint schemes. RS-32: Chicago & North Western. RS-36: Delaware & Hudson (limited



150-foot steel bridge in HO scale. BLMA Models is offering this factory-assembled, all-brass Warren truss bridge in HO scale. The bridge comes with see-through etched-metal walkways and is available painted black or silver. It sells for \$325.

edition), Family Lines (Louisville & Nashville reporting marks), Iowa Interstate (limited edition), Lehigh Valley, and National Rys. of Mexico. Two road numbers each, except limited editions; also undecorated. Eight-pin Digital Command Control plug and Accumate magnetic knuckle couplers. \$94.95; undecorated, \$84.95; limited editions, \$99.95. October 2009. Ready-to-run. Trainman line. Atlas Model Railroad Co.

HO scale freight cars

60-foot flatcar with lumber load.

Burlington Northern Santa Fe, St. Louis-San Francisco (Frisco), Soo Line, and Union Pacific. Two car numbers. Metal wheelsets and McHenry scale magnetic knuckle couplers. \$29.98. October 2009. Ready-to-Roll. Athearn Trains



Denver & Rio Grande Western HOn3 1000-series high-side gondola.

"Flying Grande" lettering (nine car numbers available), Moffat Tunnel herald (three numbers), and Royal Gorge Route herald (four numbers). Wire grab irons and Kadee magnetic knuckle couplers. \$39.95 or \$44.95 for weathered version. Ready-to-run. Blackstone Models

American Car & Foundry 4,650-cubic-foot-capacity Center Flow covered hopper.

Grain Train. Twelve car numbers (numbers 1015

and 2017 have graffiti). Etched-metal running boards, metal wheelsets, and Kadee magnetic knuckle couplers. \$31.95. Ready-to-run. InterMountain Railway Co.

40-foot wood-side refrigerator car.

Kahn's, Edelweiss, Kingan, Libby's, Minneapolis & St. Louis, and Sioux City Dressed Beef. Two car numbers each. Metal wheelsets, ex-Athearn tooling, and McHenry magnetic knuckle couplers. \$16.98. Ready-to-run. Roundhouse



Chicago, Burlington & Quincy class 50-foot single-sheathed automobile car kit. One-piece cast-resin body. Trucks and couplers not included. \$42. Speedwitch Media

► Calendar

Sept. 16-19, 2009: National Narrow Gauge Convention.

Doubletree Hotel, Colorado Springs, Colo. 29nng.com

Oct. 22-25, 2009: iHobby Expo.

Donald E. Stephens Convention Center, Rosemont, Ill.

www.ihobbyexpo.com

November 21-22, 2009: World's Greatest Hobby On Tour.

Western Washington Fairgrounds, Puyallup, Wash.

www.wghshow.com



Assorted HO scale freight cars. ExactRail LLC entered the freight car market with these ready-to-run HO scale cars. The Vert-A-Pac auto rack is available in six road names for \$29.95. The Gunderson wood-chip gondola comes painted for Georgia-Pacific Corp. or Southern Pacific for \$34.95. The Pacific Car & Foundry hi-cube boxcar is offered in five paint schemes. All have new tooling, etched-metal and wire details, magnetic knuckle couplers, and metal wheelsets.

50-foot Airslide covered hopper. Archer Daniels Midland, Burlington Northern, Corn Products Corp. International, Chicago & North Western, General American Transportation Corp., Great Northern, Golden West Service, Illinois Central Gulf, Louisville & Nashville, Milwaukee Road, Northern Pacific, and Rock Island. Metal wheelsets and Proto-Max magnetic knuckle couplers. \$21.98. Gold Line. Ready-to-run. Wm. K. Walthers Inc.

HO scale passenger cars

85-foot Pullman Palace cars.

New road names: Atchison, Topeka & Santa Fe; Canadian Pacific; Lehigh Valley; and Monon. Combine, diner, sleeper (two car names available), and observation. Factory-installed wire grab irons, metal wheelsets, and McHenry scale magnetic knuckle couplers. \$29.98. October 2009. Ready-to-run. Roundhouse



New York Central 20th Century Limited Shore-series club-lounge car. Detailed interior and underbody, sprung diaphragms, Proto-

Max magnetic knuckle couplers, and electrical contacts for interior lighting kit (sold separately for direct-current or Digital Command Control). \$64.98. Ready-to-run. Wm. K. Walthers Inc.

HO scale structures

Kim's Classic Garage kit.

Matches Kim's Classic American Home. Laser-cut microplywood, window glazing, and peel-and-stick roofing material. Two-pack, \$48.35. Atlas Model Railroad Co.



R.G. Shinnie Boatworks kit.

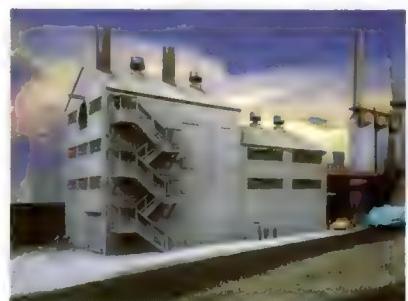
Laser-cut clapboard siding with optional wall shakes, laser-cut shakes and corrugated metal roofing, more than 30 metal detail castings, and Tichy Train Group windows and doors. 4" x 6" main building with separate 2½" x 3½" covered loading dock. \$99, plus \$11 shipping within North America. Full Steam Ahead



Speeder shed kit. Laser-cut wood, fiberboard, and plastic kit. Peel-and-stick parts and tab-and-slot construction (speeder shown not included). 3" x 3" footprint. \$24.95. Monroe Models



O'Reilly Auto Parts store kit. Styrene kit includes laser-cut and injection-molded walls, signs, and clear acrylic window glazing. 5" x 7" footprint. \$44.95. Summit USA



Blower engine house. Plastic construction. Based on a Lorain, Ohio, steel mill prototype. Simulated corrugated metal siding, rooftop stacks and vents, and exterior stairway, \$149.98. Ashland Steel series. Wm. K. Walthers Inc.

HO scale details and accessories

Model A tow truck. Automobile Club Towing, Crown, Diamond Valley Towing, S&L Motor Co., Springfield Auto Body, and Rowe's Service. Clear window glazing, detailed interior with separate steering wheel, and rolling vinyl tires. \$12.98. Ready-to-Roll. Athearn Trains

Photo-etched brass sides for Milwaukee Road passenger cars.

Streamlined 75-foot Railway Post Office-express car (car numbers 1208-1230): Sides come with two pairs each of mail and express door brass pieces; designed to fit Walthers Twin Cities Hiawatha 75-foot Express car; \$36.75. Grove-series

cafe-parlor car (numbers 180-185): Designed to fit Walthers Twin Cities Hiawatha 85-foot tap lounge car; \$31.75. Add \$4.50 shipping for direct orders. Brass Car Sides



92-foot steam railroad tugboat kit. Unpainted cast resin parts, white metal details, laser-cut plastic railings and window glazing, and glass bead running lights. \$98.50. Frenchman River Model Works

N scale locomotives

Alco C-628 and C-630 diesel locomotives. New paint schemes. C-628: Hamersley Iron (two road numbers). C-630: British Columbia Ry., Chesapeake & Ohio (four numbers with DC), and Reading Co. Unless noted, three numbers available with direct current, two numbers with Digital Command Control; also available undecorated. Accumate magnetic knuckle couplers. Direct-current model, \$109.95; with DCC, \$139.95. September 2009. Ready-to-run. Atlas Model Railroad Co.

N scale freight cars

Southern Iron & Equipment Co.

50-foot boxcar. Burlington Northern Santa Fe (pre-2005 scheme); Canadian Pacific; Chattahoochee Industrial RR; Chicago & North Western (ex-Rock Island patch scheme); Elgin, Joliet & Eastern; and Peninsula Terminal. Two car numbers each. Scale profile brake wheels, etched-metal stirrup steps, and McHenry magnetic knuckle couplers. \$16.98. September 2009. Ready-to-run. Athearn Trains

40-foot double-door boxcar.

Canadian National; CP Rail; Duluth, Winnipeg, & Pacific; Erie RR; Pere Marquette; and Seaboard Air Line. Two car numbers each; also available undecorated. Newly tooled sides and ends and Accumate magnetic knuckle couplers. \$11.95 (undecorated, \$8.95). Ready-to-run. Trainman line. Atlas Model Railroad Co.



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Assorted N scale freight cars. These ready-to-run cars are among the latest from Micro-Trains Line. Clockwise from top left are a Louis-Dreyfus three-bay Evans covered hopper, \$19.15; Burlington Northern Santa Fe 60-foot center-beam flatcar with load, \$26.20; Missouri Pacific 40-foot boxcar, \$24.50; Standard Oil 39-foot single dome tank car, \$20.60; and Chesapeake & Ohio 50-foot flatcar with load, \$16.85.



General American 46-foot drop-bottom general service

gondola. New road names: Chicago & North Western; Chicago, St. Paul, Minneapolis & Omaha (Omaha Road); Illinois Central (available in one paint scheme, four car numbers); Illinois Central/Illinois Central Gulf; Minneapolis & St. Louis; and Norfolk & Western (one paint scheme, six numbers). Unless noted, each roadname is available in three paint schemes, four numbers each. Also available undecorated and data only (black). Etched-metal brake platform, ladder stirrups, and grab irons, plastic brake wheel, brake stand, underbody brake details and shafts, and Micro-Trains magnetic knuckle couplers. \$24.95 each (except Illinois Central Gulf, \$26.95). Ready-to-run. Trainworx Inc.

N scale passenger cars

Centralia Car Shops 6-rooomette, 6-section, 4-double-bedroom Pullman lightweight sleeping car. Atchison, Topeka & Santa Fe (shadow-line paint scheme); Chicago & North Western; Erie RR; Erie Lackawanna (two car names); Illinois Central; Missouri Pacific (two names); Rock Island

(Golden State scheme); Southern Pacific (*City of San Francisco, Sunset Limited* or *Golden State* schemes); and Union Pacific (Harbor Mist Gray and Armour Yellow). Four names/numbers available unless otherwise noted. Lighted, detailed interior and Micro-Trains trucks and couplers. \$39.95. Ready-to-run. InterMountain Railway Co.

Pullman-Standard 72-foot baggage car.

Amtrak; Atchison, Topeka & Santa Fe; Chesapeake & Ohio; Chicago & North Western; Denver & Rio Grande Western; Great Northern; New York Central; Northern Pacific; Pennsylvania RR; Rock Island; Southern Pacific; and Union Pacific. Flush-mounted window glazing, electrical contacts for interior lighting kit (sold separately), sprung diaphragms, and Accumate magnetic knuckle couplers. \$39.98. Ready-to-run. Wm. K. Walthers Inc.

O scale locomotives

Electro-Motive Division MP-15DC diesel locomotive. Canadian Pacific, Chicago & North Western, Kansas City Southern, St. Louis-San Francisco (Frisco), and Texas City Terminal. Two numbers available for powered units, one for unpowered; also available undecorated. Digital Command Control with QSI Quantum sound, dual flywheels, and separately applied

Club offerings



Fort Dodge, Des Moines & Southern two-bay hopper.

Custom-decorated Accurail car offered by the Chicago & North Western Historical Society. Two car numbers available. Accumate magnetic knuckle couplers. \$16 per car, \$30 per two-pack, plus \$5 shipping per order. Illinois residents add 9.25 percent sales tax on total. Send money order to C&NWHS, P.O. Box 1068, North Riverside, IL 60546 or order online at www.cnwhs.org.

metal details. \$479.95 (unpowered, \$249.95). September 2009. Ready-to-run. Atlas O

O scale freight cars

American Car & Foundry 8,000-gallon-capacity tank car. New England Alcohol, McCahan Sugar Refining Co., Mid-Continent Petroleum (four car numbers available), Pan-Am Oils (four numbers), and Union Starch. Two numbers unless noted; also available undecorated. Metal grab irons, handrails, and stirrups, and magnetic knuckle couplers. \$64.95. Ready-to-run. Atlas O



Missouri-Kansas-Texas double-sheathed boxcar. Unpainted kits. Includes decals for red or yellow paint scheme and all details except trucks and couplers. \$129. Ultra Scale, a division of Chooch Enterprises

Z scale locomotives

Electro-Motive Division GP35 diesel locomotive. Burlington Northern Santa Fe (Heritage I scheme) and Montana Rail Link (with Washington Cos. herald). Two road numbers available. Magnetic

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Labelle no. 105 Digital Command Control Track Conditioner.

Con-Cor is offering a package of track-cleaning supplies designed to condition rail for DCC operation. The set includes a 30ml bottle of cleaning fluid, round cleaning pads, swabs, and applicator strips. The full kit sells for \$9.98; a package of replacement pads costs \$5.98.

knuckle couplers. \$195.95. Ready-to-run. Micro-Trains Line Co.

Z scale freight cars

Assorted freight cars. Standard Oil 39-foot single-dome tank car, \$21.80. 50-foot standard boxcar: Baltimore & Ohio, \$23.95, and

Canadian National ("wet noodle" logo), \$22.20. 50-foot fish-belly gondola: CSX with rock load, \$25.40, and Norfolk Southern with scrap load, \$22.60. Two car numbers each. Magnetic knuckle couplers. Ready-to-run. Micro-Trains Line Co.

Z scale passenger cars

Alaska RR Pullman-Standard smoothside passenger cars.

Yellow and blue. Baggage car, coach, dome car, and sleeper. Magnetic knuckle couplers. \$30.20 each. Ready-to-run. Micro-Trains Line Co.

Decals

Assorted decals. HO and N scale: Chesapeake & Ohio caboose; Chessie System 40- and 50-foot boxcars; Chessie System 60- and 86-foot boxcars; and SSI Leasing boxcars. N scale only: Whale belly hoppers (Burlington Northern and Chicago, Burlington & Quincy; CSX and Dragon; and Seaboard/SCL). HO scale sheets \$6.50, N scale \$5.25. Microscale Industries

Scenery



Photo backdrops. New releases: Bellows Falls (partially pictured above) and Desert Mountains. Custom photography available. Lengths start at 3 feet and vary depending on scale (on average 5 feet in N scale, 8 feet in HO, 10 feet in O). \$15 per foot. Rail Scenics

► Manufacturer listings

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Atlas Model Railroad Co.
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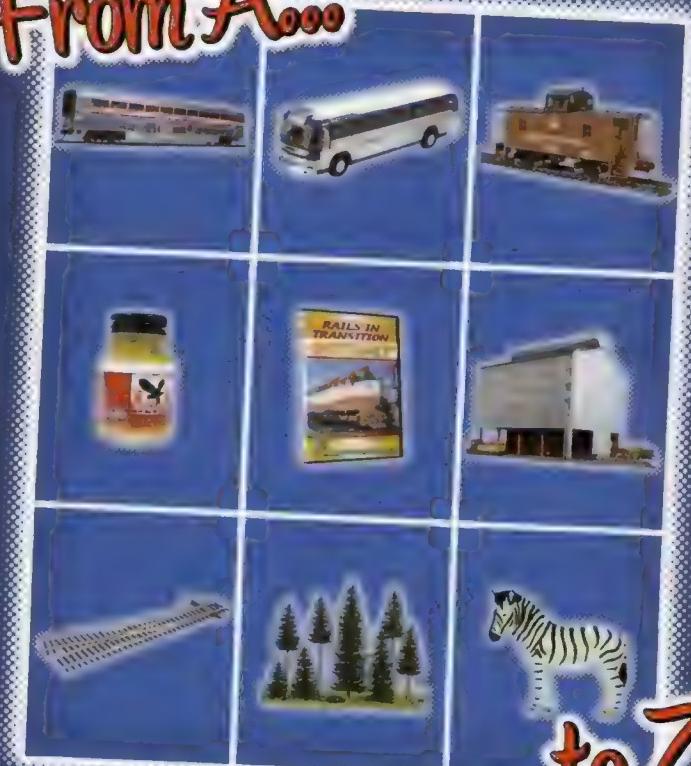
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Fig 1:
PANEL MOUNT

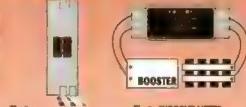


Fig 2:
DIRECT CONTACT VOLTMETER
SMOOTH WITHOUT MOUNTING

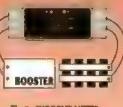


Fig 3: CURRENT METER

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Pull-down window shade

I have several large windows in my layout room. For a long time now, I've been struggling with the question of how to cover these large windows as part of the backdrop, yet make the windows accessible when needed.

Then, in the Workshop section of the June 2009 issue of *Model Railroader*, I saw the picture of the painted backdrop pull-down window shade as a removable solution. It was an "Ah-ha!" moment for me. Thanks to Greg Wright for sharing his innovative idea.

Steve Moore
West Jordan, Utah

More uses for copper foil tape

I received the latest issue of *Model Railroader* and thoroughly enjoyed the two articles on lighting layouts. I've utilized similar techniques for years.

I might add that the copper foil tape (from the stained glass hobby) can be used in many ways. The strips can be placed parallel on a piece of masking tape, thus making a flat "cable."

This can be fed under the grass mat or felt on a toy train layout, or even imbedded under scenery in detailed model railroads. You just want to be sure to also cover the exposed copper.

Another hint is to use a diode (from the versatile 1N400x family) in lieu of the resistors or even a hidden lamp (foil-covered no. 194 automotive) in series with the layout incandescent 12V lamps.

I've found success with an old tinplate transformer and the diode arrangement. Using an AC power supply, the diode effectively eliminates 50 percent of the voltage to the lamps.

When I built my Christmas layouts in the 1950s, I'd get fine copper magnet wire and string this on model telephone poles. I'd wrap the two grain-of-wheat wires around each magnet wire, and work the lamp under the edge of a roof to illuminate the building. This power actually came from the overhead wires!

Just make sure the magnet wires don't touch and are substantial enough to handle the load.

Robert Hoenes
Marietta, Ga.



To get ideas for using scenic lighting on your layout, read the June 2009 issue of *Model Railroader*. Paul Dolkos photo

Lighting a layout

The articles on lighting a layout in the June 2009 issue of *Model Railroader* were spot-on.

Lighting adds life to a layout, and moving lighting can be animation just as much as Consolidations going full-throttle, F7s cresting a hill, or Shays grinding in the back country.

In Paul Dolkos' article, "Bulbs, wire, and power," there's a photo

taken from my layout showing a roll-up door and a lighted interior (shown above). The door is animated (see Project Illustrated in the December 2006 issue of MR). When it begins to rise, the light becomes visible, first as a crack, then filling the opening, offering a dramatic reveal of the warehouse within.

Bill Day
Potomac Falls, Va.

Fascia on the Beer Line

I enjoyed reading the Beer Line series that ran in the January to May 2009 issues of *Model Railroader*. Those articles contained many new model railroad construction and "how to" modeling ideas that I've never encountered.

I realize that the Beer Line has a number of layout configurations, but what caught my eye was the unpainted hardboard fascia. Was this intentional because of the possible configuration changes and peg system?

Paul Silvio
Woodstock, Ill.

[Yes, the fascia was left unfinished for a reason. A painted fascia works great for a layout that doesn't have to come apart.

However, we learned the hard way on previous projects that when layout sections are clamped tightly together for several days, the painted fascia surfaces tend to stick together. When the parts

are separated, the paint peels.

Since the Beer Line was designed to change configurations often, we elected not to paint the fascia. — David Popp, managing editor]

Lighting-supplier addition

GR Signaling, 1551 Jefferson Drive, Carson City, NV 89706, rickgrsig@aol.com, can be added to the list of miniature-lighting suppliers in the June 2009 issue.

GR Signaling sells 1.5V micro-bulbs, flashers, and offers custom installation. — Ed.

Comments, suggestions, and additional information on *Model Railroader* articles and departments are welcome in this column. Every comment will be read, but not all can be printed or answered. Make your statement in 300 words or less, and send it to Railway Post Office, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail rpo@mrrmag.com. Please include your name, city, and state.

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Here's the south end of Chicago's busy Union Station just before the evening rush hour in July 1964. John Gruber photo

Tips for modeling a major terminal

I'm planning an N scale layout centered on the operation of a major terminal. Although I'm a Great Northern fan, I've collected various name trains made by Kato and Con-Cor. Can you explain how one of these arriving trains would be turned and serviced for its next road trip? Also, how was this work done with articulated trains like the General Motors' Aerotrain; Chicago, Burlington & Quincy's Pioneer Zephyr; and Union Pacific's M-10000?

Brian Willcocks, Norwich, U.K.

That's a difficult premise for a layout, as no prototype location served all of the name trains you mentioned. My recommendation would be to invent a freelanced Union Terminal in a generic Midwestern city that could serve all of your streamliners.

Most of North America's famous name trains originated and terminated in large cities that had nearby coach yards where the trains were serviced. If a train finished its run in a stub terminal, the road engine usually remained coupled to the train while it was unloaded.

At Chicago's Union Station, long trains often arrived on a through track so the engines and head-end cars could be pulled past the main concourse. This reduced the walking distance for the arriving passengers.

For quick turnarounds, the road engines were immediately

uncoupled and sent off to an engine terminal for servicing. On other trains, a switcher coupled onto the rear of the empty train and pulled the entire consist, including the locomotives, back to the coach yard. This yard movement was commonly routed through a car washer to clean the exterior and a wye to turn the entire train.

Besides their observation cars, name trains often included a variety of other cars (such as dome cars) that had to be oriented in a specific direction. Turning the whole consist kept everything facing the right way.

Most large railroads had their own coach yards, where the train's interior was cleaned and restocked, minor repairs were made, and bad-order cars were switched out. In smaller cities this work was often done in a single coach yard that served all the tenant railroads.

The early articulated streamliners were handled in a similar manner. However, they usually had a special track or work area so the locomotive and cars could be serviced at the same time.

Additional information on passenger terminal operations can be found in "The Operators" column in the September 2007 *Model Railroader*, and in *The Model Railroader's Guide to Passenger Equipment & Operation* by Andy Sperandeo (Kalmbach Books). — Jim Hediger, senior editor



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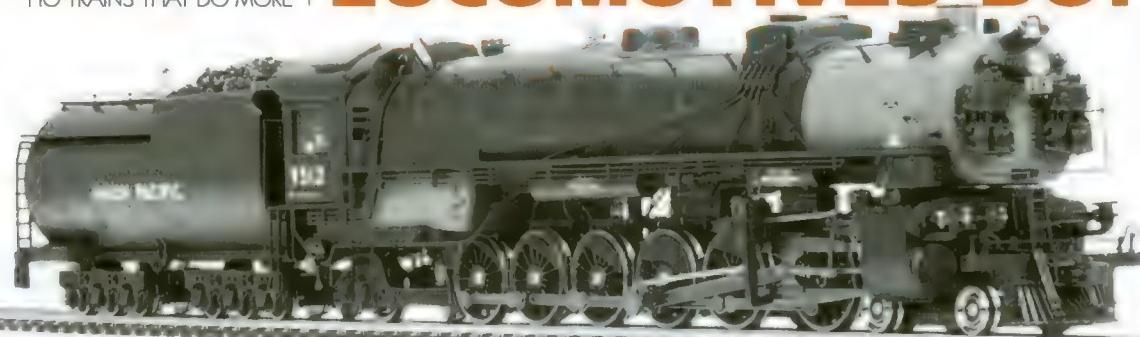
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Information Desk



It's hard to miss the safety message on this F59PHI. Terry Thompson photo

Spreading the word

It would be difficult to ignore the wild colors and safety message splashed all over this Amtrak California F59PHI locomotive. It runs on the *Surfliner* trains that travel along the beaches between Los Angeles and San Diego as part of a program to warn the public about the dangers of taking shortcuts across the tracks.

MR's publisher Terry Thompson photographed this striking locomotive on a visit to San Diego.



These signs near Oakdale, Tenn., warn Norfolk Southern crews to be alert for signals. Bruce Ernatt photos

Think safety all the time

Bruce Ernatt photographed these safety signs that northbound Norfolk Southern crews encounter as they depart Oakdale, Tenn. Oakdale is a crew change point on the NS routes between Chattanooga or Knoxville, Tenn., and Louisville, Ky.

"Call them all" is a display showing five signal indications

that engine crews are supposed to call out to each other as soon as a signal comes into view. The names of the indications shown on the sign are, from left to right: Clear, Approach, Restricting, Diverging Approach, and Stop.

"Don't crowd me" is on another sign as a reminder to keep the train's speed under control so it can stop well short of any stop signal. — J.D.H.

Auger in the tender?

One of my videos shows an auger in the bottom of a steam locomotive tender, and I'm wondering if it helped deliver coal to the firebox or if the coal still had to be shoveled in by hand?

Tony Thompson, Strathmore Park, Wellington, New Zealand

The auger in the tender is part of the locomotive's stoker system. This device transferred coal from the tender, and into smaller augers that fed the coal into the firebox. Duplex stokers lifted the coal to the upper corners, while regular stokers delivered it to the bottom center just below the firebox doors. From these delivery points, jets of high pressure steam blew the coal into the firebox in a fan-shaped pattern. Even so, the fireman still had to hand-fire the back corners of the firebox to maintain an even fire across the grates. — J.D.H.

Send your questions about prototype railroading to Information Desk, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail proto@mrmag.com. We regret we can't answer all the questions we receive.



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Fig. 1 Manual track cleaner. Bill DeBuvitz modified a Märklin gondola to build this handy manual track cleaning car for use within the tight clearances on his Z scale layout. Photos by Bill DeBuvitz

Build a manual track cleaning car

Cleaning track can be a chore for most modelers, but it's especially difficult in Z scale. And clean track is especially important in Z scale where the lightweight locomotives and tiny wheels need all the electrical contact they can get to operate.

From my experience, manual scrubbing with a Walthers Bright Boy is the most effective way to clean track. But this is only possible where the track is easily accessible (no bridges or tunnels). In Z scale, the clearances are so tight that some sort of track cleaning car is required.

I've had good results in HO and N scales using a pair of Centerline cars (one with the roller dampened with solvent or contact cleaner, and one running dry) to clean the track, and an Aztec car with an abrasive roller to keep it clean.

Aztec is the only firm to make an effective Z scale track cleaning car that a locomotive can pull, and I use one on my layout.

I made my own version of a Centerline-type car for manual cleaning. **Figure 1** shows the car I made from a Märklin gondola, although it could also be done with any similar gondola. The N scale roller is available from Centerline through the Web site at www.centerline-products.com.

My Z scale model was slightly too narrow for the N scale roller, so I cut the gondola in half, smoothed the cuts, and cemented .030" styrene strips across the cut ends. Then I reassembled the body with a $\frac{1}{16}$ " gap in the center using .030" x $\frac{1}{4}$ " x $2\frac{3}{8}$ " strips as

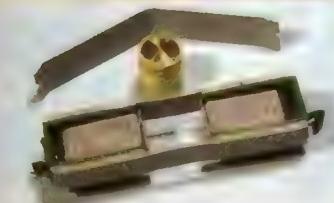


Fig. 2 Parts. Bill added weights to improve tracking and help hold the plastic handle in place.



Fig. 3 Underframe. Two styrene half-rounds keep the toweling on the roller from snagging.

splices along the car sides. I also added some weights to improve tracking. See **fig. 2**.

My handle is a .030" styrene strip that's bent in the center. The length of this strip determines the height of the handle as it's bent to fit into the car.

I added half-sections of $\frac{1}{8}$ " styrene tubing along the cut edges of the floor as shown in **fig. 3**. This prevents the paper towel on the roller from catching on the sharp edges.

Whenever I need to clean track, I simply push the car around with one finger. See **fig. 1**. I've been doing this for a couple of years now, and have found the combination of my manual cleaner and the Aztec car does an effective job on my Z scale railroad. — William DeBuvitz, Mendham, N.J.



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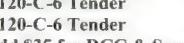
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Lionel Strang uses lightweight plastic sheeting that's pinned in place to keep the dust off his model railroad during the summer when he's touring on his Harley.

Airborne dust

Dust is a model railroad's biggest enemy, and I've spent many years struggling to keep my HO scale Allegheny & Lackawanna Southern from being inundated with it. Of course, the best way to keep dust off the rails is to keep the railroad operating. I've found it's much easier to clean the wheels of a locomotive than it is to clean all of the track on a 20 x 30-foot model railroad.

Like many modelers in snow country, when spring comes I like to get outside to do yard work, play a round of golf, or ride my motorcycle. Some years there may be as much as three or four months of down time for the railroad. I always kept the railroad room closed, but no matter what I did, a fine covering of dust settled on the layout. I discovered two simple ways of keeping dust to a minimum in the railroad room.

When I'm not riding my motorcycle for any length of time, I cover it to keep it clean. I realized that I could do the same thing with my railroad, using thin plastic sheeting sold in home-improvement stores. The plastic is so lightweight that I can secure it with a few pushpins, and it takes less than an hour to cover the entire railroad.

Combating my wife's allergies led me to another effective way to keep dust off the railroad. We bought a portable air purifier for a bedroom, and it did such a good job that I decided to buy a couple more for the train room. I've been pleased with the amount of dust reduction I've seen, and these small purifiers have a minimal effect on our electric bill. —Lionel Strang, contributing editor

Bonding rail to styrene

I've recently purchased a number of styrene structure kits which require the installation of individual rails in their floors. Could you suggest the best adhesive to bond the metal to the styrene?

Gary Brandstetter
Plattsburgh, N.Y.

First, wipe off the rails with a little lacquer thinner to clean off any oil on the rails. Test fit the first rail in the groove, then lift it up and apply a drop or two of medium viscosity cyanoacrylate adhesive (CA) in the groove. Check to make sure the rail is straight before the CA sets. Then repeat the procedure for the second rail, but this time you'll need to take extra care to make sure the rails are in gauge before the CA hardens. —Jim Hediger, senior editor

Turnout radii?

Can you tell me the radii of no. 4, no. 6, and no. 8 turnouts?

John McLaughlin
San Antonio, Texas

Numbered turnouts aren't normally curved, so they diverge at a shallow angle corresponding to their names: a no. 4 diverges 1 unit of width in 4 units of length, a no. 6 spreads 1 unit of width in 6 units of length, and a no. 8 spreads 1 unit of width in 8 units of length. However, all of them have a corresponding substitution radius where the curve blends smoothly into the angle of the turnout. For an HO scale no. 4 turnout it's 29", a no. 6 is 56", and a no. 8 is 110".

HO sectional track turnouts don't follow this prototype practice, as they're made with an 18"-radius diverging route. This tight curve allows the turnout to be used in a layout in place of any full straight or 18" radius track section, and other scales use similar geometry. —J.D.H.

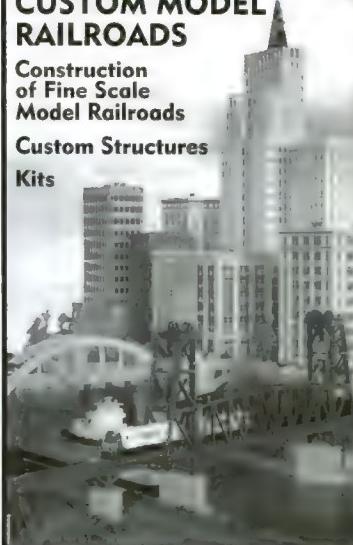
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A small hill with a rock cut, topped with trees and telegraph poles, adds interest to a corner of the N scale Southern Ry. Spartanburg Subdivision layout. Follow along as Steven Otte shows how he created the scene.

Add a rocky cut to the corner of a layout

My N scale Spartanburg Subdivision layout is built on a flat surface of extruded-foam insulation board. So when I considered what to do with a small corner outside of a double-track curve, I thought adding a hill would help break up the flat look.

Adding a rock cut on the side of the hill would not only make the scene more interesting, it would also allow me to make the hill taller without creating an unrealistic slope. I cast my own plaster rocks, using a mold I made the old-fashioned way from crumpled

aluminum foil. I also put in a drainage ditch between the hill and the tracks.

Finally, I topped off the hill with trees and scratchbuilt telegraph poles to suggest scenery that continues beyond the edge of the layout. **MR**

Step 1 Shaping the hill



I shaped the hill out of extruded foam insulation, just like I'd used for the base of the layout. I took a 2"-thick block, set it against the framework in the corner, and pressed it onto the layout. The rails left an impression in the foam.

Using a keyhole saw (and working over a trash can to catch the foam bits), I cut the foam about two inches out from the impression left by the rails. I then used a Surform rasp to round off the hilltop and smooth the top of the cut. I left the sides that would touch the outside edges of the layout square.

Step 1 Shaping the hill (cont'd.)

Next, I marked the edge of the hill on the foam base and used a utility knife to cut a drainage ditch along the track. I then glued the hill into place with latex caulk.

To texture the hill, I mixed up a batch of Sculptamold. This is a papier-mâché-like material you mix with water. It dries hard, and will stick to almost anything, so I wore rubber gloves to keep my hands clean. I smoothed the material over the hill and the ditch, creating a porous surface that would be more receptive to plaster and paint. I let the Sculptamold dry overnight.



Step 2 A foil rock mold

I made my rock mold from a sheet of aluminum foil. I rolled up the foil and crumpled it lengthwise, so all the crinkles would lie in the same direction. I then unrolled it and shaped it against the side of the hill, shiny side in. This resulted in a convex mold that sloped down toward the edges. Next, I straightened the foil out on a table and curled up the edges to form a lip before pouring in the plaster.

I mixed a batch of plaster of Paris, a little thicker than pancake batter, and poured it into the foil mold, about $\frac{1}{4}$ " deep.



Step 3 Applying the rocks



After letting the plaster harden for a couple hours, it was "green" – solid, but still slightly damp and cool to the touch. I removed it from the mold and placed it on a cutting mat. Since my hillside was concave but my casting was flat, I took a razor saw to the casting and cut it along the molded-in grooves into $\frac{3}{4}$ " wide strips. I then broke those

strips into chunks that I could apply, mosaic-style, to the side of the hill.

I mixed a small cup of thick plaster, the consistency of yogurt, to hold the rocks on the hillside. As I applied the rocks, I filled the gaps between them by smoothing the thick plaster into the joints with a damp finger.

Working the rocks with wet, plaster-coated fingers obscured and softened some of the molded detail. Once the plaster was dry, I used a hobby knife to carve new grooves and cracks into the surface. This restored the texture and blended the adjacent castings together. I removed the debris afterward with a shop vacuum.

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Photo: Ken Lawrence

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Step by Step

Step 4 Coloring the rocks



I colored the hill with earth-colored latex paint. I didn't want sandstone rocks, though, so while the paint was not quite dry, I painted the higher surfaces with Polly Scale L&N Gray. The next step was to enhance the shadows and cracks. I used a soft brush to wash an alcohol-based stain mixture over the rocks, letting it run into the crevices. Finally, I lightly drybrushed the rocks with Polly Scale Reefer White. This gave a nice contrast between the high spots and the dark crevices.

Step 5 Finishing the scene



After the paint dried, I used a broad paintbrush to apply full-strength white glue to the non-rock parts of the hill. I sprinkled on Timberline Scenery's forest-floor blend, a mix of fine and coarse ground foam, twigs, and other scale deadfall. I added a few patches of darker ground foam to give the hill some variation.

I then used a small brush to paint thin lines of white glue along cracks and ledges on the rock, and sprinkled on coarse green ground foam to represent foliage that had taken root between the stones.

I painted the bottom of the drainage ditch a muddy dark brown color, sprinkled in some Woodland Scenics talus and HO scale ballast, and poured in a thin layer of Woodland Scenics Realistic Water.



Finally, I topped off the hill with some Woodland Scenics trees and scratchbuilt line poles. I strung the poles with Berkshire Valley's EZ Line, a thin, elastic line that bounces back when bumped.

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1. Three Montana Northland Electro-Motive Division SD40s pull a train over Lolo Pass on Neil Roggensack's HO scale Montana Northland RR. The scene is on the top level of Neil's three-level, "mushroom"-style layout.

3 decks for operation

High ceilings inspire a three-deck "mushroom" layout set in the Pacific Northwest

By Dave Rickaby • Photos by the author



2. Layout owner Neil Roggensack, left, watches his train from the raised floor inside the "mushroom." Behind him, fellow operator Tom Watson switches the middle deck. The track plan on the next page shows their positions.

Have you ever seen a freelanced model railroad in a magazine and thought that it could have been real – in other words, that the modeler had based his layout on an actual railroad? As a high school student, Neil Roggensack got that impression reading about Eric Brooman's Utah Belt.

Some have thought of the Utah Belt as a real railroad because of its believable and well-thought-out concept. Not long after the first article on the Utah Belt appeared in *Model Railroader* in 1978, Neil knew that someday he'd build something like it, and the seed of his Montana Northland RR was planted.

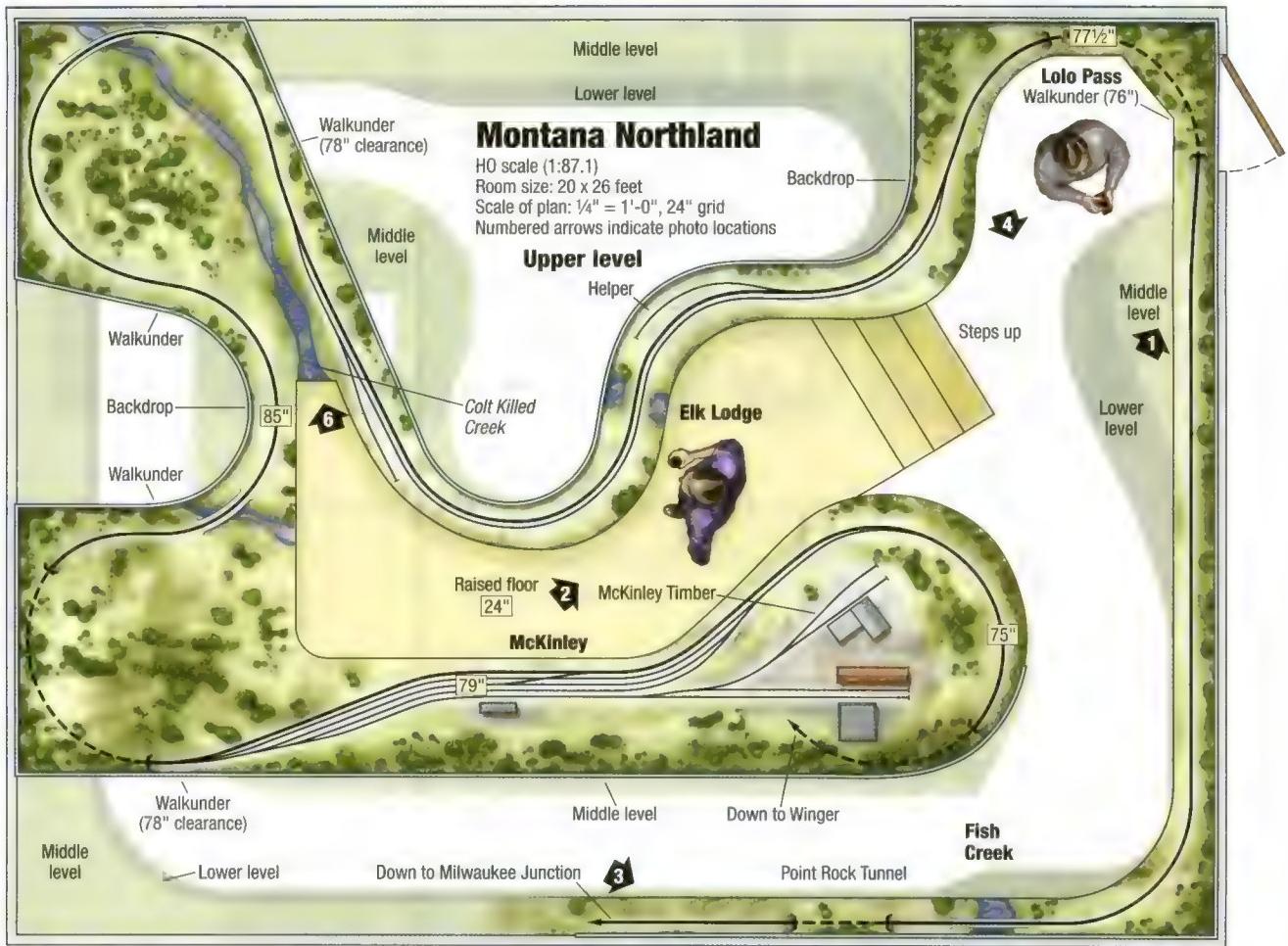
When Neil started to design his layout years later, his goal was to build the

longest main line possible. Because his 20 x 26-foot layout space had nine-foot ceilings, he decided that up was the way to go.

Neil had read about the late John Armstrong's "mushroom" concept, so he melded this idea with a helix and three decks of operations to gain the longest main line he could – 495 feet! After negotiations with his wife, he was also given space in the adjacent garage for a classification yard and staging.

High concept

Neil envisioned his freelanced line as a Class 1 railroad connecting Salt Lake City with Portland, Ore., and Seattle. The road's main line would run through central Idaho, where at Milbank, the



Illustrations by Theo Cobb



Northern Division main line splits off to traverse the Bitterroot Mountains through Lolo Pass on its way to Missoula, Mont. From there the line enters Canada and runs north to Edmonton.

The road would be a bridge route between the Canadian National and Canadian Pacific to the north and the Southern Pacific to the south and west. It would also interchange with the Bur-

lington Northern, Western Pacific, Milwaukee Road, and Denver & Rio Grande Western. It would generate online traffic including coal, gold, lead, zinc, copper, talc, grain, and forest products.

The modeled portion of the railroad is point to point from Milbank, Idaho, to Missoula, Mont. The focus of Neil's layout is operating trains as they ascend the tortuous grades of the Bitter-

3. A Burlington Northern U-33C leads two Montana Northland EMD SDs through Point Rock Tunnel with an eastbound freight.

root Mountains through Lolo Pass, requiring helper service.

Layout construction

Neil started building this layout, his first, in 1998. He constructed open-grid

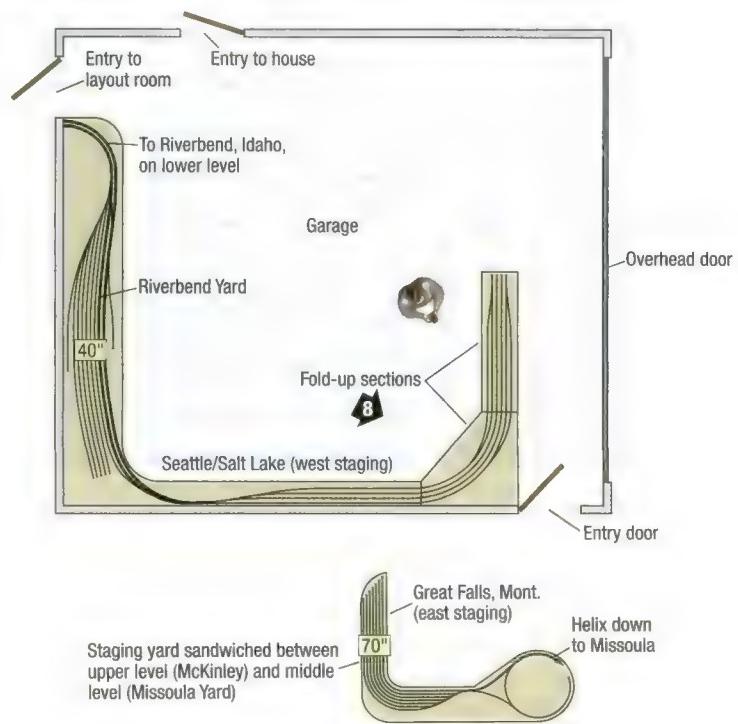


The layout at a glance

Name: Montana Northland
Scale: HO (1:87.1)
Size: 20 X 26 feet, plus adjacent staging
Prototype: freelance
Locale: Western Montana/Central Idaho
Era: late 1970s
Style: three-level mushroom
Benchwork: open grid made from plywood
Height: 40" to 106"
Roadbed: Homasote and spline
Track: Atlas code 83
Mainline run: 495 feet
Minimum radius: 30"
Minimum turnout: no. 6
Maximum grade: 2 percent
Scenery: Paper towels soaked with joint compound over screen wire and Styrofoam
Backdrop: Masonite and Sheetrock
Control: Railcommand DCC by CVP

Additional staging areas

Scale of drawings: $\frac{1}{8}$ " = 1'-0", 24" grid





4. Riverbend, Flat Grass, and Lolo Pass are stacked to the left of the room's entrance. The black cylinder to the right encloses the helix between decks.

benchwork using lumber ripped from plywood as described by his friend, Bill Kirchmeyer, in a *Model Railroader* article "Plywood benchwork" (December 1998). Neil found this type of benchwork to be very inexpensive, and it doesn't warp. All three levels are built using this method.

His track is Atlas code 83 flextrack laid on Homasote and spline roadbed and painted with a blend of Polly Scale Roof Brown and Grimy Black. He uses Caboose Industries ground throws to control accessible turnouts, while Tortoise switch machines are used in some areas, especially in the hidden staging.

Great Falls is an attraction in itself, with a viewing window in the fascia. A diode routing system controls the switch machines that line turnouts in and out.

Real rocks and artificial trees

Neil started his scenery with screen forms and contoured Styrofoam. He then dipped paper towels into a soupy mix of joint compound and layered it onto these forms. He covered the terrain with real dirt and Woodland Scenics ground foam. For low bushes, he used Woodland Scenics clump foliage and lichen. All the water is made with Woodland Scenics Easy Water.

Neil models rocks with a variety of materials, including real rocks, plaster cast in rock molds, and joint compound hand-carved directly on the layout. He then colors the rocks with a variety of earth-tone latex paints.

Almost all of Neil's trees are pines made from artificial Christmas tree branches. He cuts them into different lengths, trims them into tree shapes, and roughs them up so they don't look too uniform. He then paints them with green latex paint and, while the paint is wet, coats them with Woodland Scenics

Montana Northland train list

Train no.	Call time	Route	Notes/Works
242	12:15 A.M.	Riverbend to Missoula	Pine Cabin
243	12:30 A.M.	Missoula to Riverbend	Milw. Junction, McKinley
900	1:45 A.M.	Butte to Missoula	
301	2:10 A.M.	Spokane to Riverbend	
254	3:00 A.M.	Riverbend to Missoula	
Xtra West	3:10 A.M.	Missoula to Riverbend	Potash loads
Milw 201	4:35 A.M.	Missoula to Alberton	
PCT	6:00 A.M.	Riverbend (turn)	Pine Cabin, Fields
241	7:00 A.M.	Missoula to Riverbend	Pine Cabin
WPPX	8:00 A.M.	Riverbend to Missoula	Priority
Milw 200	9:30 A.M.	Alberton to Missoula	
903	10:00 A.M.	Missoula (turn)	Milw. Junction, Flatgrass
244	11:30 A.M.	Riverbend to Missoula	Milw. Junction, McKinley
253	1:00 P.M.	Missoula to Riverbend	
Milw 203	1:45 P.M.	Alberton to Missoula	Milw. Junction
BNF	3:15 P.M.	Missoula to Riverbend	Priority
252	4:45 P.M.	Riverbend to Missoula	Pine Cabin
MT	5:00 P.M.	Riverbend (turn)	McKinley, Winger
Xtra East	5:20 P.M.	Riverbend to Missoula	Potash empties
251	6:00 P.M.	Missoula	Riverbend to Pine Cabin
Milw 202	7:00 P.M.	Alberton to Missoula	Milw. Junction
300	8:30 P.M.	Riverbend to Spokane	
901	10:30 P.M.	Missoula to Butte	
PCT: Pine Cabin Turn. Works Pine Cabin and Fields.			
MT: McKinley Turn. Works McKinley and Winger.			
BNF: Burlington Northern Forwarder			
WPPX: Western Pacific Produce extra.			
All trains are run as extras. The call time is for crew call only.			
Milwaukee Road trains have trackage rights between Missoula and Milwaukee Junction. Extras can be called at Missoula or Riverbend if power and crew is available.			

ground foam. So far, he's planted some 850 trees on the layout.

His backdrop is hand-painted on Masonite and wallboard. To paint trees on the backdrop, he cut a paintbrush into a generic tree shape and dabbed it on the hillside at various heights to represent distant trees. He then used a triangular sponge to dab on conifer shapes for the nearer tree line. Finally, he used a colored pencil to draw in trunks and branches. Though Neil admits this was a tedious task, he says the final result makes it worthwhile.

Operations for a dozen

Neil's layout was designed and built for realistic train operations. The Montana Northland requires 12 operators. These include a dispatcher, a helper crew, the yardmaster at Missoula, and another one at Riverbend. The rest are one-man road crews. If more than 12 people show up for an operating session, Neil won't turn them away. He can always assign two-man crews or run more extras.

Montana Northland motive power assignments feature Electro-Motive Division SD40s, GP40s, GP38s, SD7s,



5. A Montana Northland GP7 switches the co-op grain elevator at Fields.

SD24s, F7s (which have been relegated to helper service), and General Electric U-boats. Pool power from the Burlington Northern, Southern Pacific, and several other railroads from the region are regularly used on Montana Northland trains as well, while the Milwaukee Road trains use their own power. Since Neil models the late 1970s, every train is run as an extra with a symbol.

Operating No. 243

Let's follow westbound train No. 243 as it leaves Missoula, Mont., bound for Riverbend after midnight.

The first stop is Milwaukee Junction. If the Missoula Yard crew hasn't already taken out Milwaukee Road-bound cars, the crew will drop them here for the next Milwaukee Road train to pick up. Here, also, helpers are put on for the push over Lolo Pass. The helpers cut off at Elk Lodge, and the train is on its own downhill.

Next, the train will stop at McKinley to set out cars at the timber mill and pick up westbound cars. Then it's down the helix.

Train 243's ultimate destination is Portland, Ore., so the crew will set out cars for Salt Lake City or Ogden at Riverbend, where all cars to and from these southerly destinations are exchanged. In theory, one-half mile west of Riverbend Yard would be the wye at Milbank, where the Northern Division connects to the main line from Salt Lake City to Portland, Ore. On the layout, though, this is represented by west-end staging. —D.R.

Trains are dispatched with track warrants via OCS (Occupancy Control System). Operators use two-way radios to communicate with the dispatcher. They carry clipboards with pads of OCS sheets to copy the track warrants and are required to OS (report their trains "out of station") at every town.

The dispatcher has his own pad of OCS sheets and notes all train move-



6. Montana Northland no. 2209 leads a string of Geeps into the siding at Elk Lodge, Idaho, while a Milwaukee Road train waits for the main line to clear.

ments and track warrants on a train sheet. Neil uses car cards and four-cycle waybills to handle car forwarding.

Trains are run in sequence using call times for the crews. The crews report for duty when called, and Neil says it's rare if any of the trains actually leave on time. Trains are run using a 6:1 fast clock, but Neil admits he uses it mostly to know when to quit. After 24 fast-clock hours, the session is over.

A normal operating session will start around 6 p.m. and last about five hours. The sessions are held every six to eight weeks. He says he'd like to schedule them more often, but never seems to have the time.

A day on the Montana Northern

At the beginning of a typical operating session, all of the trains are staged, most of them at the east end (Great Falls). Three trains are staged in the west end (Seattle and Salt Lake City). By 2:10 a.m., four trains are ready.

The Missoula yardmaster is particularly busy, because this is where all of the interchange with the Milwaukee Road and Burlington Northern happens. Blocks of cars bound for Salt Lake City are dropped here, and others are swapped for delivery to the east.

Missoula is also where helper engines are serviced. Venerable F7s head out from here to Milwaukee Junction and help push trains over Lolo Pass.

There are three local freights. The Pine Cabin Turn leaves Riverbend and runs to Pine Cabin. The McKinley Turn switches McKinley and Winger. The Flatgrass Turn runs between Missoula and Flatgrass. Neil says that the turns are the most sought-after jobs.

The line to Butte also sees its fair share of traffic. Train 900 comes down the Butte Line early in the operating session. All told, 20 to 25 trains will pass over this layout in 24 hours worth of fast time.

A great time for the hobby

Neil feels that it's a great time to be a model railroader because so many neat things are going on. He points to all of the wonderful products coming out and loves the exquisite detail available on ready-to-run rolling stock.

He also says operating is awesome. "There's nothing like going to someone



else's layout and operating their railroad instead of just watching the trains run around," Neil says. "When you operate on their layout, you can really get the feel for what they are trying to do, whether it be a freelanced railroad or a prototype. You can experience the type of operation that they use, such as using track warrants and radios or timetables, train orders, and telephones."

Neil also appreciates all the camaraderie and friendships that he has found in this hobby, and he invites those who are just getting started to come operate on his layout. He realizes some would rather just build models, but he encourages everyone to try operating.

"If you build it, they will come," Neil says, but adds, "If you build it well, they'll come back!" **MR**

Writer and photographer Dave Rickaby is a frequent contributor to Model Railroader. His most recent article was "Steaming through the Winter Wonderland," in February 2009.

The Riverrail group

Neil is a member of the Riverrail operating group, which is based in the LaCrosse, Wis., area. This round-robin operating group was started as the Shortflaggers by Ron Copher, who was a member of the Midwest Railroad Modelers in Batavia, Ill. The group has attended many operating invitationals in Kansas City, Chicago, and the Twin Cities, and hosts its own invitational every two years. The 2008 Riverrail Invitational featured eight layouts run by about 70 operators. Neil hosted three sessions that weekend. For more information on the Riverrail group and their layouts, go to www.riverrail.com. — D.R.



7. No. 8715, pool power from the Southern Pacific, crosses the Lochsa River bridge on the Montana Northland's lowest level. Neil poured the river with Woodland Scenics Easy Water.



8. Neil folds up the tail end of the staging yard representing Seattle and Salt Lake in the garage next to the layout room. The 10-foot-long section is hinged to hang on the wall when not in use, allowing Neil to park in the garage.



► Meet Neil Roggensack

Neil, 46, a gas technician for an energy utility, lives in West Salem, Wis., with his wife, Angela, and their daughter, Krisa. He first became interested in trains growing up in LaCrosse, Wis., close to Grand Crossing, an interlocking between three railroads. Neil would like to thank all those from the Riverrail group who have helped him design, build, and operate his layout.

Make a ball signal



A vintage signal that has served for nearly a century

By Lou Sassi • Photos by the author

Railroaders have long used the term "highball," but I'd never thought much about it until I began building an On2½ diorama that included a ball signal. My friend Rich Cobb scratchbuilt the signal for me to use next to my model of the Strong, Maine, depot on the Sandy River & Rangeley Lakes RR.

I'd never delved into the use of ball signals before, but my inquisitive nature soon had me searching books and the Internet to learn more about how these early signals functioned. I discovered that the primary use of a ball signal was to control traffic passing through junctions or crossings.

Signal indications

Ball signal indications varied from place to place, so the specific indications for each location were carefully spelled out in the railroad's employee timetable. For example, on the SR&RL, the ball signal at Strong controlled train move-

ments at the junction between the main line and a branch line, the Bigelow Division. According to *Supplement No. 1 to Rules for Employees on the SR&RL* dated April 1st, 1908:

"ONE RED BALL AT MAST HEAD BY DAY OR ONE RED LIGHT BY NIGHT WILL ALLOW TRAINS APPROACHING STRONG ON THE MAIN LINE FROM THE NORTH RIGHT OF WAY INTO THE YARD."

"TWO RED BALLS AT MAST HEAD BY DAY OR TWO RED LIGHTS BY NIGHT ALLOW TRAINS FROM THE SOUTH RIGHT OF WAY INTO STRONG YARD."

"THREE RED BALLS BY DAY OR THREE RED LIGHTS BY NIGHT ALLOW TRAINS FROM THE BIGELOW DIVISION RIGHT OF WAY INTO STRONG YARD."

"THE ABSENCE OF SIGNALS ALLOWS TRAINS TO WORK IN STRONG YARD."

Thus, the number of balls displayed authorized different train movements from various directions. Lanterns were hung below the balls so the signal indication could be seen at night.

Sandy River & Rangeley Lakes RR 2-4-4T Forney no. 9 gets the highball to leave Strong, Maine, and head west on Lou Sassi's On2½ diorama.

In almost all cases, when a ball (or balls) were raised to their highest position on their mast it meant a specific movement could proceed, leading to the railroad term "highball," meaning to get going.

A scratchbuilt ball signal

Rich scratchbuilt his ball signal from basswood as shown in the illustration. It consists of a 4 x 8 mast and two sets of horizontal arms. The lower set of arms is made from 36" lengths of angle iron (styrene), mounted with lag bolts, so the bars can pivot up and down to allow slack in their cables when necessary. This allows the signalman to add or remove balls or lanterns to change the signal indication.

The upper crossarms are a pair of nine-foot lengths of 3 x 6 bolted to the signal mast. Rich's signal balls are not balls at all, but lengths of styrene rod with the ends sanded to a rounded shape. He used pulleys and bearings

Typical ball signal construction

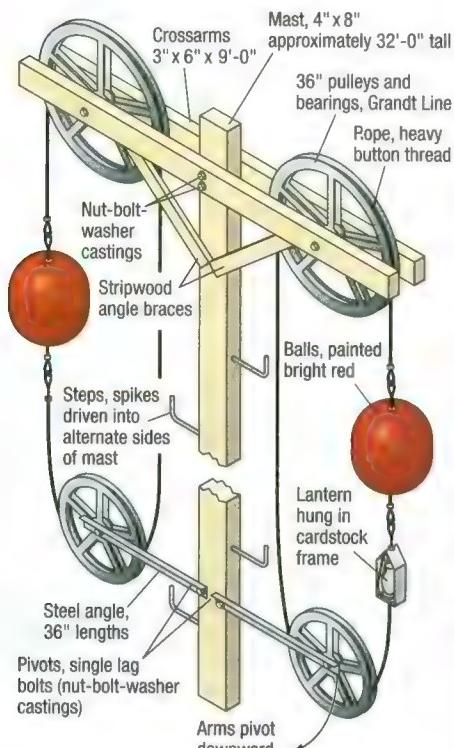


Illustration by Rick Johnson

Historic background

Ball signals were introduced as aids to ocean navigation, where they were widely used as tide signals to relay water depth to ships entering a harbor from the sea. The first use of ball signals by a North American railroad dates to the 1830s on the 20-mile-long New Castle & French Town RR in Delaware. Although used throughout the United States, they lasted the longest on New England railroads. — L.S.

from a Grandt Line O scale Chama coal chute detail kit (no. 3046), while the lanterns are from Caboose Industries' tall switch stands enclosed in simulated metal frames made of heavy cardstock. Heavy button thread represents the prototype's cables. **MR**

Lou Sassi is a prolific author and photographer of model railroads. His most recent book is How to Build and Detail Model Railroad Scenes vol. 2, available from Kalmbach Books.



The crossing tender is changing the number of signal balls he will display to clear the route Boston & Maine engine no. 1731 will take as it passes through Whitefield, N.H. in July 1978. The brackets beneath the balls are used to hold kerosene lanterns to display night indications. Robert Gabby photo



Sometime in the 1930s, this signal displaying two balls authorized the arrival of a SR&RL train at Phillips, Maine. Edward Bond took the undated photo.

Scratchbuild the Sheller Feed Co.

Author Bruce Petty used selective compression to reduce the prototype feed mill's overall length to fit into a space on his HO scale Los Angeles & San Fernando Valley RR.



Commercial parts simplify a structure built from photographs

By Bruce Petty • Photos by the author

For most of the 20th century, rural feed mills were the farmers' general store. I discovered the prototype Sheller Feed Co. in 1963, shortly after I received my first drivers' license and began exploring the Southern Pacific RR's Shasta route across the San Fernando Valley. This feed mill was located near San Fernando on SP's main line to Oregon via Tehachapi Pass.

The Sheller Feed Co. that I modeled was built when the San Fernando Valley was mostly farmland. But, by the 1960s, Sheller was one of the Valley's last feed suppliers that continued to use railroad service. By then, many of the former feed mills had switched to selling lumber for the booming home construction business.



Vintage prototype. Overhead storage bins account for the extra height in the mill's production building, while the lower warehouse served as a sales room for a wide variety of construction materials and farm supplies in the 1960s.

Modeling from photos

I've had to do a great deal of scratch-building to get appropriate structures for my SP layout set in the Los Angeles area. Following are the methods that I used to build my feed mill, and you can easily adapt my techniques to other structures. This feed mill will fit into either a rural or urban scene, and it's sim-

ilar to corrugated steel structures that house all sorts of other businesses.

Selective compression is a common modeling technique that reduces a prototype structure's overall size without losing its proportions or character. This is normally done by reducing the number of repetitive features such as dock doors, the number of storage bins, or

the building's length, height, or width. My feed mill model has been compressed to fit a specific space on my layout. Its length and width are reduced slightly, but I maintained the relative height. The roof pitch is slightly steeper because I made my building a bit narrower.

Using an HO scale rule and graph paper, I drew the building's walls using dimensions I'd estimated from my photos. The building plans show the compressed model and its final dimensions. I never bothered to photograph the back of the structure in 1963, so I had to guess at the door details.

Assuming that the same construction methods would be used throughout the prototype structure, I copied the trackside sliding door to add a pair of doors for truck loading on the back of the warehouse. I also added a single 10-foot sliding door to the processing building at ground level.

Construction materials

I learned the basic styrene construction methods shortly after plain sheet and dimensioned strip styrene came on the market in the 1970s. If you're just getting started, you'll find the book *Styrene Modeling*, published by Evergreen Scale Models, does a good job of explaining the basic techniques.

Today's modelers have a large selection of plain and textured styrene sheet, dimensional strips, and all sorts of structural shapes to choose from thanks to Evergreen, The N Scale Architect, Plas-struct, and Rix, among others.

A large selection of commercially molded styrene detail parts, doors, and windows is also available. However, I've still found that many of the door and window sizes I need are unavailable. In the real world construction materials come in hundreds of sizes and types, so few model companies are likely to produce windows and doors close enough for every need. This meant I had to learn to scratchbuild them myself. Making my own detail parts wasn't difficult, and it grew easier with practice.

Plant construction

My feed mill is built in two sections: the production end and the warehouse. These smaller, individual mill structures are easier to work on, paint, and weather than handling one large piece.

I started by cutting out the foundation pieces and marking horizontal board lines on them in pencil. I then used a steel straight edge and a hobby knife with a flat, narrow blade to scrape varying amounts of material off the flat outside surface to represent individual "boards" in the sheet styrene.



Fig. 1 Basic box. The production building is essentially a rectangular styrene box detailed with corrugated siding, scale 8x8 timbers, and small pieces of styrene shaped to match items visible in the drawings and prototype photos.



Fig. 2 Grain bin. Two sides of the prototype's large grain bin are visible at the exterior corner of the production building. Tall grain conveyor kits are available commercially, but the boxcar unloading chute will have to be scratchbuilt.

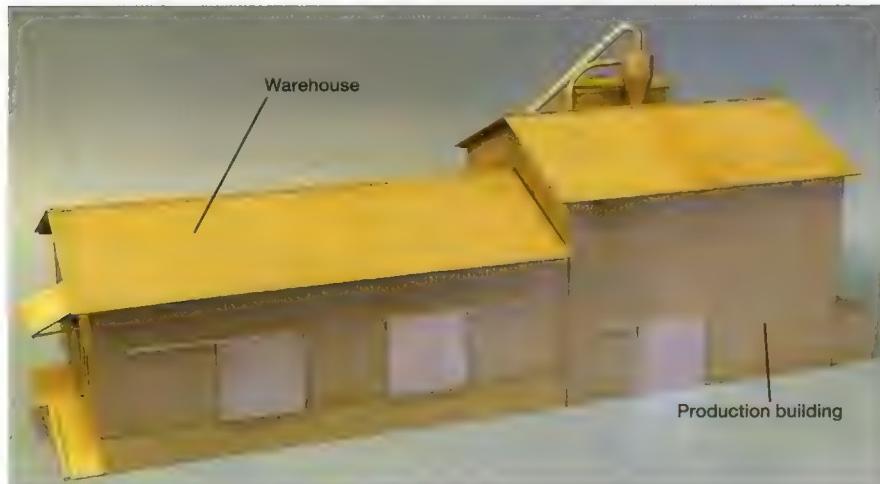
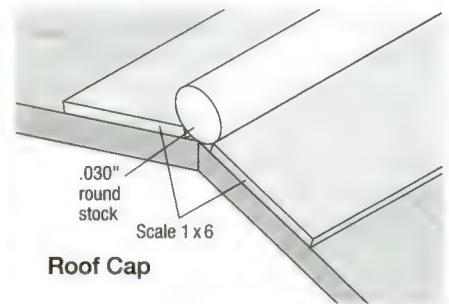


Fig. 3 Warehouse. The author's warehouse was built as a separate structure that's butted against the production building. Since the entire prototype mill looks like it was built at the same time, all of the sliding doors are the same size.

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Sheller Feed Co.
sign converted to
HO Scale



Illustrations by Rick Johnson

All of my walls and roofs are made from textured sheet styrene that simulates corrugated steel siding. This sheet styrene is .040" thick, so all of the exposed roof edges need a tapered undercut to conceal this thickness. Note the roof overhangs in **fig. 1** on page 45.

I laid each styrene panel corrugated side down on a plate glass work surface next to a steel straight edge .020" thick. Using a chisel blade in my hobby knife, I made several passes to scrape about half the thickness (.020") off the edge of the siding to make it look more like a thin sheet metal roof.

Next, I cut the door, vent, and window openings through the corrugated walls using the back edge of a no. 11 hobby knife blade and a straight edge.

► Materials List

Evergreen Scale Models styrene

- 100 .010" x .020" strip
- 142 .040" square strip
- 175 .100" square strip
- 210 .030" rod
- 294 .125" angle
- 409 .250" square strip
- 2030 .030" sheet
- 2100 .010" sheet
- 4526 corrugated metal siding,
.040" spacing,
- 8106 scale 1 x 6
- 8204 scale 2 x 4
- 8206 scale 2 x 6
- 8208 scale 2 x 8

Floquil paint

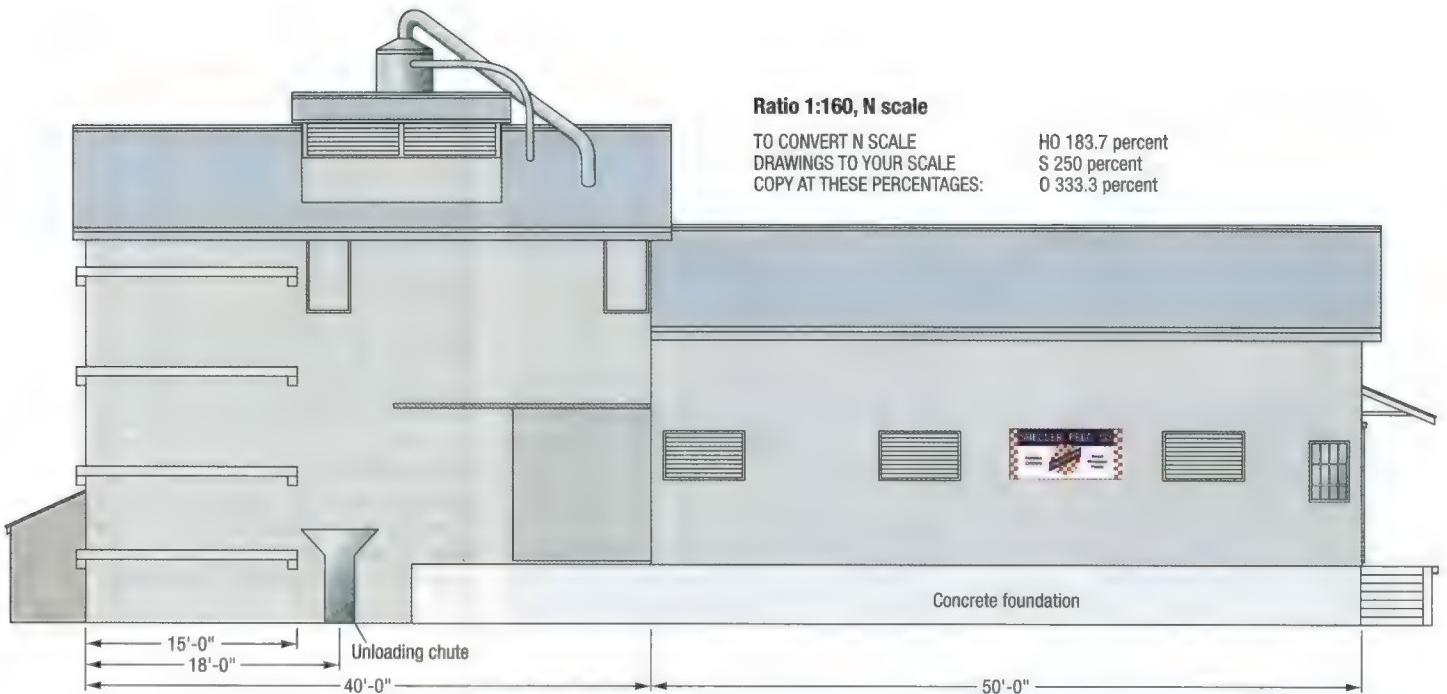
- 110006 Dust
- 110073 Rust
- 110081 Earth
- 110082 Concrete
- 110086 Grime
- 110100 Old Silver

Rix Products

- 407 grain elevator
- 611 cyclone and vents

Miscellaneous

- Tenax-7R liquid plastic cement
- Testors liquid plastic cement



Framing the openings

The easiest method I've found for framing the wall openings is to work on a sheet of plate glass covered with

More on our Web site

A PDF file of the full color artwork for the Sheller Feed Co. sign is available from the *Model Railroader* Web site at www.ModelRailroader.com.

wax paper. I lay the individual walls on the glass and then cut and fit the framing in all of the openings.

I use Tenax-7R liquid plastic cement, applied with a small paintbrush, to secure these framing joints. The wax paper keeps the cement from melting the styrene onto the glass. Once the cement hardens, I use a small flat file to clean up the edges and corners.

I frame each window opening with scale 2 x 4s, and use a 2 x 6 for the bot-

Fig. 4 Customer entrance. The street end of the warehouse has a concrete truck dock with steps on one side and a ramp on the other so retail customers can pick up large items.

tom sill. Then I cut and fit .010" x .020" strips, mounted on edge to make the window mullions.

My ventilator openings are similarly framed with 2 x 6s, and I use the same 2 x 6s, set at a 30-degree angle, to make the side louvers seen in **fig. 1**. Similar



Fig. 5 Bin construction. This elevated feed loading bin is a small styrene box fitted with a sloping roof and hopper bottom. The legs and crossbraces are fabricated from $\frac{1}{8}$ " styrene angle with lower bin braces made of $.030"$ rod.

The feed mill business

Mills like the Sheller Feed Co. produced a variety of bulk livestock feeds, and they received processed grain and other raw materials by rail, including barley, molasses, oats, shelled corn, and soybeans. These materials were mixed in various ratios (including custom mixes) to make feed for livestock. Some of this feed was bagged, but most of it was sold in bulk orders. Many mills owned special hopper-bottom feed delivery trucks for this purpose.

In the era before covered hoppers, grain was commonly shipped in 40-foot boxcars fitted with temporary grain doors. These wood or heavy cardboard grain doors were nailed or stapled to the inside of the boxcar's doorways to keep the grain away from the sliding doors.

Inbound loads of grain were spotted with the doorway next to the mill's receiving chute. This chute can be seen near the bottom-center of the taller processing building in the prototype picture on page 45. The top of the chute tipped down like a drawbridge until it was just below an open boxcar door. Then the grain door was cut to release the load so it could run into the chute and be conveyed into a dry storage bin. After the initial flow stopped, laborers had to climb into the boxcar to hand shovel the rest of the grain out of both ends. This was hard work, especially on a hot day, but labor was cheap.

Most feed mills also sold all sorts of other farm supplies, including bagged fertilizer, cinder blocks, fencing and barbed wire, hay, repair parts, and tools. Some even got into tractor and implement sales. In general, the farther away from the city, the more items a mill would sell. —B.P.



Fig. 6 Piping details. Dust collectors and ventilators are made by several suppliers. Plastic sprues can be easily trimmed and shaped to look like the large sheet metal piping that transfers grain and chaff around a feed mill.

louvers were used in the cupola, the trackside wall of the warehouse, and near the roof peaks of both buildings.

All of the sliding doors are pieces of $.030"$ styrene.

Final assembly

After beveling the inside corner joints, I assembled the four walls of the production building. I also added $\frac{1}{4}$ " square styrene reinforcing strips inside the corners and along the top and bottom edges of the walls.

Next, I installed the scale 8 x 8 (Evergreen $.100"$ square) timbers that reinforce the walls of the storage bin. See **figs. 1 and 2**. Note that these timbers aren't equally spaced as they're closer together for additional strength near the bottom of the bin.

I airbrushed Floquil no. 110016 Aged Concrete on the foundation and loading dock as shown in **fig. 3** on page 46. After the paint dried, I used blue painters' tape to mask that area. Then I installed a corrugated metal roof over the end loading dock door. See **fig. 4**.

I made small details, like the loading bin and auger conveyor in **fig. 5**, from scraps of styrene. The dust collector in **fig. 6** is a commercial part, while plastic sprues make great piping.

My next step was to spray the entire building with Floquil Old Silver. After it dried, I applied Floquil's Dust, Earth, Grime, and Rust weathering colors to age the structure and give it an appropriately dusty appearance. **MR**

Bruce Petty has been modeling the SP in HO scale since the early 1960s and has authored six books on SP standard plans and maintenance equipment. His Los Angeles & San Fernando Valley RR appeared in Great Model Railroads 2006.

How to make a distant tree line with scuff pads



The addition of a low-relief tree line between the last row of trees and backdrop makes this shallow setting appear deeper.

A strip of inexpensive scuff pad helps blend layout scenery into a backdrop

By Lance Mindheim
Photos by the author

There are plenty of established techniques for adding foreground and background scenery to your model railroad. However, the installation of transitional scenery between these two areas is often overlooked. Since a layout itself is three-dimensional, and a backdrop is two-dimensional, the point where the two surfaces converge can be abrupt. By adding simple scenery to this area, as shown in **fig. 1**, you'll soften the transition from the horizontal layout surface to the vertical backdrop and create a realistic setting with greater depth.

If you observe the landscape in most areas of the United States, you'll typically see a scenic element obstructing



Lance Mindheim uses 33-foot long rolls of Mikron Mirlon no. 18-573-448 scuff pad, purchased from beavertools.com, to create distant tree lines along his layout backdrop.

the horizon. One of the most common natural buffers is a tree or shrub line, so I considered how to use them to help transition the scenery where the layout meets the backdrop.

Since my layouts tend to feature flat topography, I had a number of scenes where the tree lines were quite far in the distance. What I needed was a way

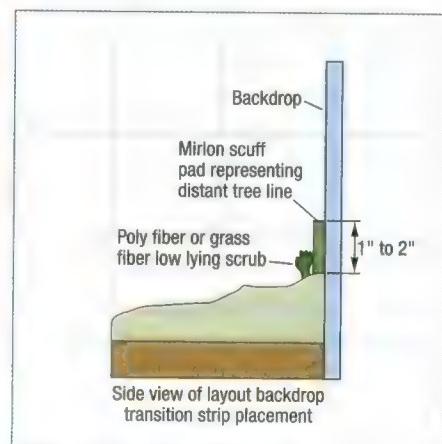


Fig. 1 Transitional scenery. This cross section of a layout depicts the ideal placement of components to make a scenic transition between the foreground and backdrop.

to simply and inexpensively model distant and less detailed trees.

On a recent trip to the hardware store, I discovered synthetic steel wool scuff pads. This gray material is about $\frac{1}{4}$ " thick, cuts easily with scissors, and has just enough texture to be a good stand in for a distant tree line. Because hardware stores typically sell it only in



Fig. 2 Cut undulating shape. After cutting the continuous roll of scuff pad into 4-foot sections, use scissors to make a wavy, lengthwise cut down the middle of the strip.

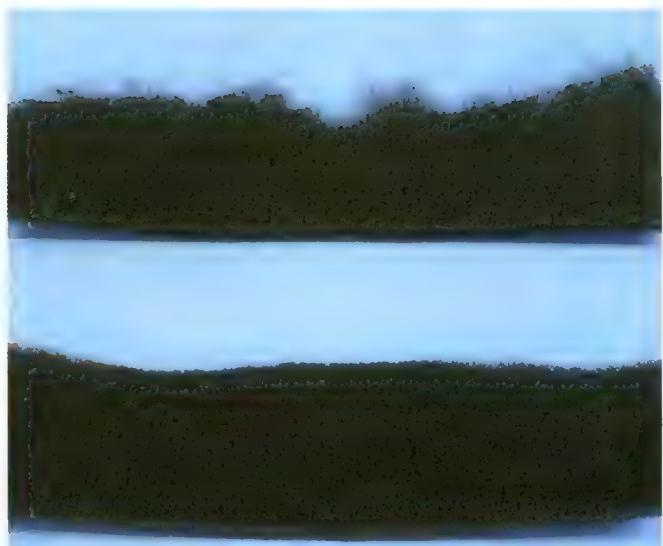


Fig. 3 Rough or smooth edges. The scuff pad can be torn by hand for a more ragged appearance (top) or cut with scissors for a smooth tree line (bottom).



Fig. 4 Tree line installation. One method for installing a strip of scuff pad is to partially insert toothpicks along the backdrop and then push the strip onto the exposed ends.



Fig. 5 Masking the transition. Hide the bottom of the tree line by adding tufts and patches of poly fiber or grass fiber mats along the base of the scuff pad.

► Parts List

Heki
1576 Grass fiber, forest floor
1577 Grass fiber, dark green

Mirka (Beaver Tools)
18-573-448 Mirlon 4" x 33'-0" ultra fine scuff roll, gray

Woodland Scenics
S190 Scenic Glue

Miscellaneous
Wood toothpicks

short lengths, I prefer ordering 33-foot long by 4"-wide rolls. You can purchase these through online suppliers, such as www.beavertools.com.

Another advantage to using a 4"-wide continuous roll is that it can be cut lengthwise to effectively double the amount of material you have to create nearly seamless horizontal scenery along the layout backdrop.

Preparing the material

Although a continuous roll of scuff pads is convenient, I found that working with long sections is a bit cumbersome. Using a pair of scissors, I first cut the roll into 4-foot lengths. Next, as

shown in **fig. 2**, I made a wavy cut lengthwise down the middle of the 4-foot strip, producing two pieces with a gently undulating top. Using sharp scissors helps keep the cut edges of the scuff pads smooth and clean. However, you can also score the material with a utility knife and tear it to produce two pieces with rough, textured edges. **Figure 3** shows the two types of edges.

The material I purchased comes in a dull gray color that looks appropriate for a distant tree line, without painting. If you want to add a hint of color, try painting the material with a light mist of Floquil Roof Brown, applied from a spray can in a well-ventilated

A scuff pad alternative



In this scene Lance modeled a short stretch of tree line and wanted to represent foliage with more color and texture. To do this, he used spray adhesive to affix Woodland Scenics foliage material to styrene sheet.

There are some locations on my layout where I want to represent a short stretch of horizon that's much closer to the viewer. These locations require more color and texture, so I used transitional scenery strips formed by affixing Woodland Scenics F54 Conifer Green or F53 Dark Green foliage to styrene sheet.

First, I use a hobby knife to carve a gently undulating tree line shape into a 2" wide strip of .060" sheet styrene. Next, I paint the strip with plastic-compatible flat black spray paint. After allowing the paint to dry, I cover the painted side of the styrene with 3M Super 77 spray adhesive and wait a few seconds before adding Woodland Scenics Foliage material. Then I use scissors to trim the shape of the foliage.

I typically wedge the styrene foliage strip behind existing trees installed along the backdrop. If this isn't possible, I'll use hot glue to attach the styrene strip the backdrop. Finally, I add transitional scenery, including brown or green poly fiber, Heki grass fiber mats, and dense patches of Scenic Express Super Trees, as previously described. —L.M.

area. Be sure to allow the painted scuff pad material to dry before starting to install it on a layout.

Installing the tree line

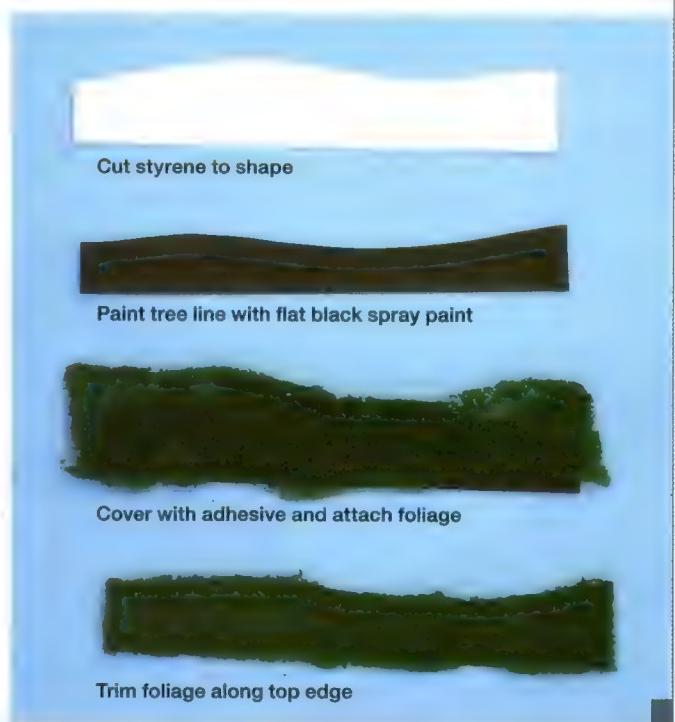
There are two ways to install the pieces you've prepared. One method is to push a row of toothpicks halfway into the scenery base at 8" to 12" intervals and then push the pad onto the exposed sticks. See **fig. 4**. If you haven't installed a backdrop, another option is

to attach the strip at the back of the layout using hot glue. In this case, you may need to insert a few toothpicks through the material and scenery base to temporarily hold the strip.

As **fig. 5** shows, I hide the bottom of the tree line between the scuff pad and the foreground scenery by gluing tufts of light vegetation or scrub along the base of the strip. Poly fiber, Heki grass fiber, or small trees all work well in this background location.

Using this simple and inexpensive process, I can install several feet of textured, low-relief strips that realistically bridge the transition between my layout surface and backdrop – all in the course of an evening. **MR**

Lance Mindheim is a frequent contributor to Model Railroader magazine. His N and HO scale layouts have each appeared in recent issues of Great Model Railroads magazine.



True-to-prototype Texas main line

An old TCS machine inspires the newest Cat Mountain & Santa Fe

By David Barrow • Photos by Tommy Holt

The latest version of my HO scale Cat Mountain & Santa Fe Ry. is rooted more firmly than ever in the full-size Atchison, Topeka & Santa Fe. It represents a change from the emphasis on industrial switching of my previous model railroad. That layout was based on the industrial zones around Lubbock, Texas, and I described it in *Model Railroad Planning 2004*. Since then I decided that I'd prefer a railroad that combined main-line operation with switching, while remaining faithful to the prototype. To explain how I reached that point, it helps to look back a few years.

Remembering TCS

In 1986, I heard that the Santa Fe was planning to discard several Union Switch & Signal Co. TCS machines in Amarillo, Texas. ("TCS" means "Traffic Control System," the Santa Fe name for Centralized Traffic Control.) Some friends and I went to Amarillo with the idea of acquiring one of the US&S standard 5-foot cabinets to be re-purposed for use by my CM&SF dispatcher. But removing the machine proved beyond our means at the time, and we settled for purchasing some of the control handles and lettering plates to install on a working replica of a TCS machine.

At the same time, I photographed a 7½-foot machine that controlled the Fourth District of the Plains Division, the railroad from Slaton west through Lubbock to Texico, on the Texas-New Mexico border. At that point it joined the Santa Fe's Southern District main line between Chicago and California. (Originally called the Belen Cutoff, the Southern District is known to today's BNSF railroaders as the "Transcon.")

I didn't know it then, but many years later those photos helped me decide to build a model railroad representing the east end of the line once controlled by that machine.



The several railroads I've built in the last 36 years have all modeled Santa Fe operations in west Texas in either 1952 or 1978, sometimes with a freelanced track plan and sometimes more closely based on the prototype. I decided to build this one as a "strict" prototype-based model of the line from Lubbock to Slaton in 1978.

One interesting thing about Lubbock was that it was an important junction for the Santa Fe. As the map on page 54 shows, the former Slaton Division main line running northwest-southeast between Texico and central Texas connected at Lubbock with the Plainview District running north to Canyon, just west of Amarillo on the Southern District main line. This was the connection from the Lubbock-Slaton area to Kansas City and points east; other Santa Fe lines connected Amarillo with Denver by way of Boise City, Okla., and La Junta, Colo.

Lubbock itself had two yards and several industrial switching zones (as modeled on my previous layout). Several branch lines also radiated from Lubbock and Slaton.

As the dispatcher saw it

The track model diagram on the TCS machine I photographed was laid out with Slaton, the east end of the line, on the left and Lubbock to the right. All

the model railroads I'd built so far were oriented to look north, which makes it easy for operators to remember that east is to the right. Now it seemed to me that I could design an attractive plan with interesting operation looking south, as the dispatcher in the office in Amarillo saw the railroad.

The section of the TCS track model I decided to follow included the Upper and Lower Yards at Lubbock, the main line with a passing siding at Burris, and the Slaton Yard. I'd include some of the industrial zones also, although obviously they weren't under the dispatcher's control and were therefore not shown on the track model. Some of these zones are represented on my railroad as single spurs, a form of on-layout staging.

Design choices

My choices for layout design include a single-level walkaround arrangement with wide aisles and staging in another room. Previous layout expansions left me with a main room over my garage measuring approximately 24 x 36 feet, and an adjacent 6 x 36-foot room that I use for walk-in staging.

I also like designing and building model railroads with segmental benchwork sections that I call "dominoes." A domino is a section of open-grid benchwork framing that can have risers to support towns and open country roadbed if changes in elevation are required or, in flat country, no risers at all.

They can be any width or length, but mine are 18" to 24" wide and 48" long. I find that this is a size I can easily handle.

1. A mainline freight roars east through Posey on David Barrow's latest HO scale Cat Mountain & Santa Fe. Most of the layout is built to David's minimalist esthetic, but he scincked this area to show the appearance of the high plains country around Lubbock and Slaton, Texas.





This is the Santa Fe Traffic Control System (TCS) machine that inspired David's layout. Tony Privett took the upper photo recently in the restored Harvey House at Slaton. David took the close-up showing Lubbock at the right on the track model, with Slaton to the left, during his visit to Amarillo in 1986.

To design layouts, I first lay out the benchwork in the room – arranging the rectangular sections is where the “domino” name comes from. Then I lay out track on the benchwork that best fits the room with the wide aisles I want to maintain. After trying different domino arrangements I chose the one shown in the track plan opposite for my Lubbock-to-Slaton layout.

Although compressed in length, the track arrangements shown closely follow the prototype track layouts at each yard or station. This helps in our effort to reproduce the prototype's operation, since train and switching movements on the model have to follow the track patterns of the full-size Santa Fe.

I've maintained the minimalist design esthetic I'd adopted for my indus-

trial railroad. It emphasizes a clean overall look, a studio-like room setting, and a “representational” approach to the prototype.

I do enjoy realistic, fully scenicked model railroads with detailed structures, and I scenicked the Posey area, seen on pages 52 and 53, to show what the high plains around Slaton and Lubbock look like. Elsewhere I focused on simplicity, ease of construction, and reliable operation with little or no maintenance.

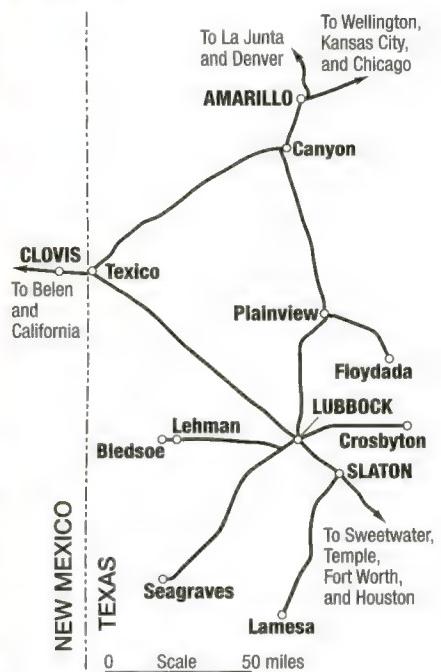
Dominoes speed construction

I built the new layout using dominoes from previous layouts; another advantage of these benchwork sections is that they're reusable. The open grid framing is $\frac{3}{4}$ " birch plywood with $\frac{3}{4}$ " birch plywood tops. As the Lubbock-to-

Atchison, Topeka & Santa Fe

Plains Division

(not all lines shown)



○ Amarillo
○ Clovis
○ Lubbock

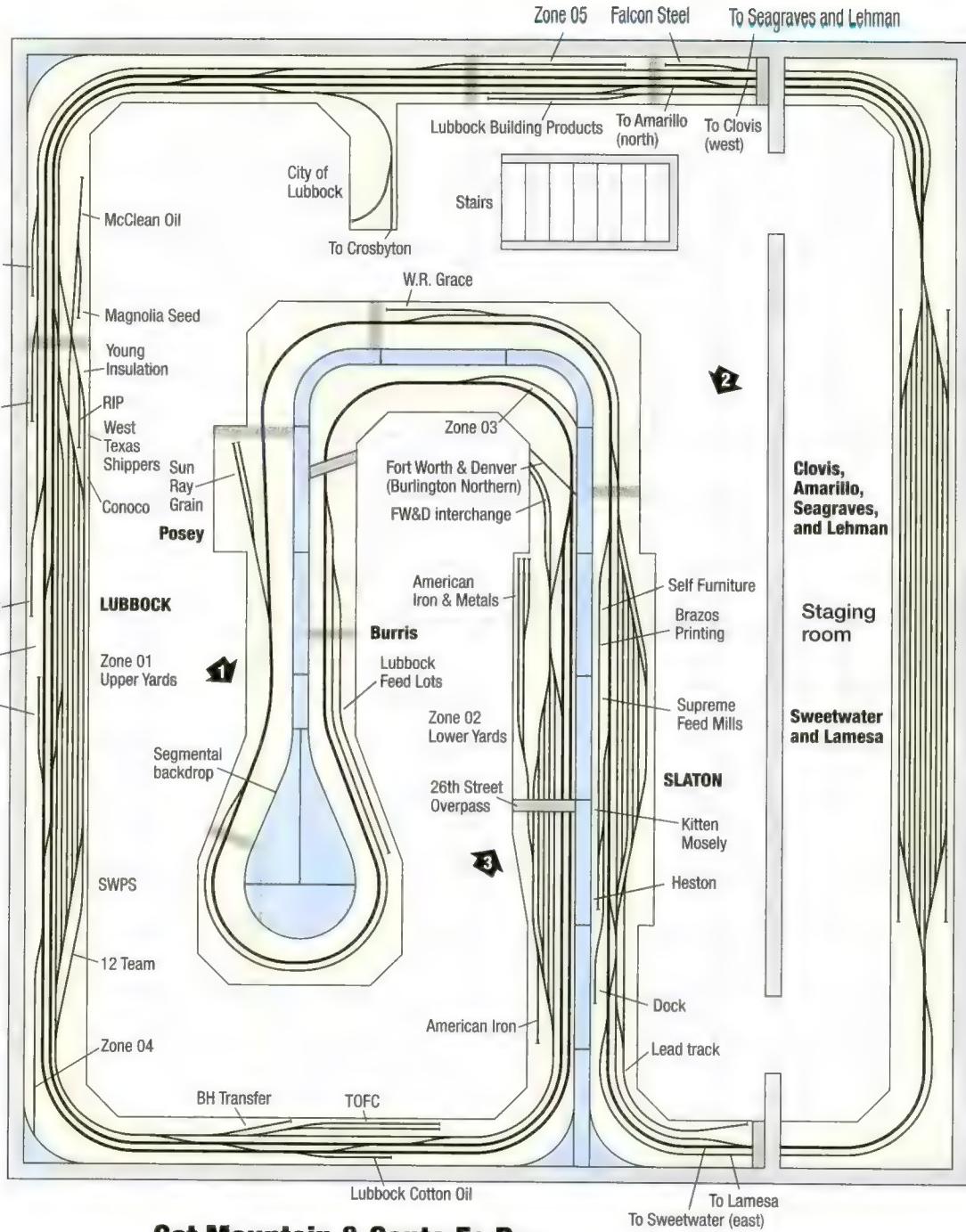
T E X A S

Illustrations by Rick Johnson

Slaton area is visually flat, I built the sections without risers. The scene separators are newly built domino backdrop segments that I described in the June 2007 *Model Railroader*.

I used sheets of $\frac{1}{4}$ " lauan plywood for the roadbed in towns and beveled lauan strips in open country on top of the dominoes. The track is Atlas code 100 flextrack.

To keep the wiring simple I use “hot switches,” Atlas turnouts with both routes always live, and line the points with ground throws from Caboose Industries. I use CVP Products Easy DCC Digital Command Control with wireless throttles. These don't require a cab bus or plug panels, another wiring simplification. The rails are powered with a minimum number of feeders.



The layout at a glance

Name: Cat Mountain & Santa Fe
Scale: HO (1:87.1)
Size: 29'-6" x 35'-6"
Prototype: Fourth District, Plains Division, AT&SF Ry.
Locale: Lubbock to Slaton, Texas
Era: 1978

Style: linear walkaround
Mainline run: 210 feet
Minimum radius: 32"
Minimum turnout: no. 6
Maximum grade: none
Benchwork: domino sectional
Height: 54"

Roadbed: $\frac{1}{4}$ " lauan plywood
Track: code 100 flextrack
Scenery: plaster with ground foam
Backdrop: painted wallboard; domino segments on peninsula
Control: CVP Products EasyDCC Digital Command Control



Here's David dressed as a yardmaster at the desk in the downstairs office/crew lounge. The yardmaster maintains the car card files and writes switch lists.



2. The yard at Slaton is near the east end of the modeled territory. Here through trains set out and pick up cars moving to and from the nearby industries.



3. A rebuilt GP7 working as the Lower Yards switcher is "on spot" while a westbound freight arrives in Lubbock.

Payoff in operation

My friends and I try to run the railroad as much like the full-size Santa Fe as we can. I've learned from railroaders about train symbols, schedules, blocking instructions, and daily switch crew assignments in Lubbock. I've used these to set up operations based on reality.

We have a Lubbock yardmaster, two switch crews at Lubbock's Upper Yards, a switch crew at the Lower Yards, a "yard clerk" or assistant yardmaster and switch crew at Slaton, and a dispatcher. Two engineers run the mainline trains. As on the Santa Fe in 1978, the Lubbock yardmaster is in charge of the two Lubbock yards and the one at Slaton. In keeping with the layout's period, we communicate with two-way radios.

The dispatcher and yardmaster work in the garage's downstairs office and crew lounge. I've built 5 feet of the 7½-foot TCS cabinet I photographed in 1986. Currently the dispatcher sits at that desk and authorizes movements by radio, keeping track of trains with Post-it notes on a printed track diagram.

The yardmaster has a desk opposite with file boxes for car cards and waybills. The crews upstairs do their work guided by switch lists the yardmaster writes before each operating session, and the yardmaster updates the card files from the completed switch lists to reflect car movements on the layout.

Operating the Santa Fe way

We run two different sessions using a four-to-one fast clock. One is a two-hour session modeling from midnight to 8 a.m., and the other is a three-hour session from 8 a.m. to 8 p.m. These time spans include all the local and through trains scheduled to pass through Lub-

bock and Slaton in 1978, although some trains ran at other times.

In Santa Fe practice, through trains changed crews at Slaton. Most through trains set out and picked up in both the Slaton and Lubbock yards, although the yardmaster's permission was often required for westbound trains to switch in Lubbock.

The work was divided at Lubbock, with through trains setting out and picking up in the Lower Yards and local freights and in-town switch jobs working in the Upper Yards. The interaction between the Upper Yards, Lower Yards, and Slaton makes the Lubbock yardmaster's job an interesting one.

Rewards of prototype modeling

One of the joys of modeling part of a full-size railroad at a particular time and place is continuing to learn about that time and place. Although some of the industries in the area are now gone or have been replaced, the track arrangement and the operations in Lubbock and Slaton today are remarkably like what they were in 1978.

There can be some surprises as well. It's been 23 years since the Santa Fe discarded the TCS cabinets at Amarillo. The Slaton Railroad Heritage Association, a group formed in 1990, recently completed restoration of the old Harvey House in Slaton. The Harvey restaurants were famous along the Santa Fe for their fine food and for the Harvey Girls who made up their wait staffs. The Harvey House in Slaton also served as the Santa Fe depot in later years.

In 2007 I learned there was a TCS cabinet there. I phoned the association and asked about it. To my amazement I found the group had the TCS machine that had controlled the line from Slaton to Texico, the one I'd seen in Amarillo all those years before. It had been saved in a warehouse in Lubbock. The upper photograph on page 54 shows it on display in Slaton's restored Harvey House. **MR**

David Barrow is an architect in Austin, Texas. He's shared the many developments along his Cat Mountain Line with MR, Great Model Railroads, and MRP readers since 1984.

More on our Web site

To compare the current CM&SF with David's previous railroad, you can download a PDF of his 2004 *Model Railroad Planning* article. It's free at www.ModelRailroader.com.

Walkaround dispatching



Here's the Traffic Control System interlocking – the "OS" section – at the east end of the Burris passing siding, with wire nuts serving as signals in David's "Wireless Dispatcher-Interactive Signaling" (WDIS) system.

Version 7 of my Cat Mountain & Santa Fe, published in the September 1999 *Model Railroader*, was completely signaled and dispatched by signal indication using an exact replica of a Union Switch & Signal Co. Centralized Traffic Control machine, or Traffic Control System (TCS) cabinet in Santa Fe parlance. The wiring to make all that work in those days was very extensive, and it had required a lot of work, including much help from friends.

So far I've built my Lubbock-to-Slaton layout by myself. Today the system components, wiring, and software to build a signal system are somewhat simpler than they were in the past. I may again enlist some help to install one, using the new 5-foot TCS cabinet I've built. For now the dispatcher uses its desk and track model as described in the main story.

Before reaching this point, however, I used another approach to provide the effect of an operating signal system on my current layout. It had no cost to speak of and no wiring at all. I called it "Wireless Dispatcher-Interactive Signaling" (WDIS).

My first version was the simplest, using red, yellow, and green wire nuts. A wire nut was simply placed beside the track at the location of each dispatcher-controlled signal.

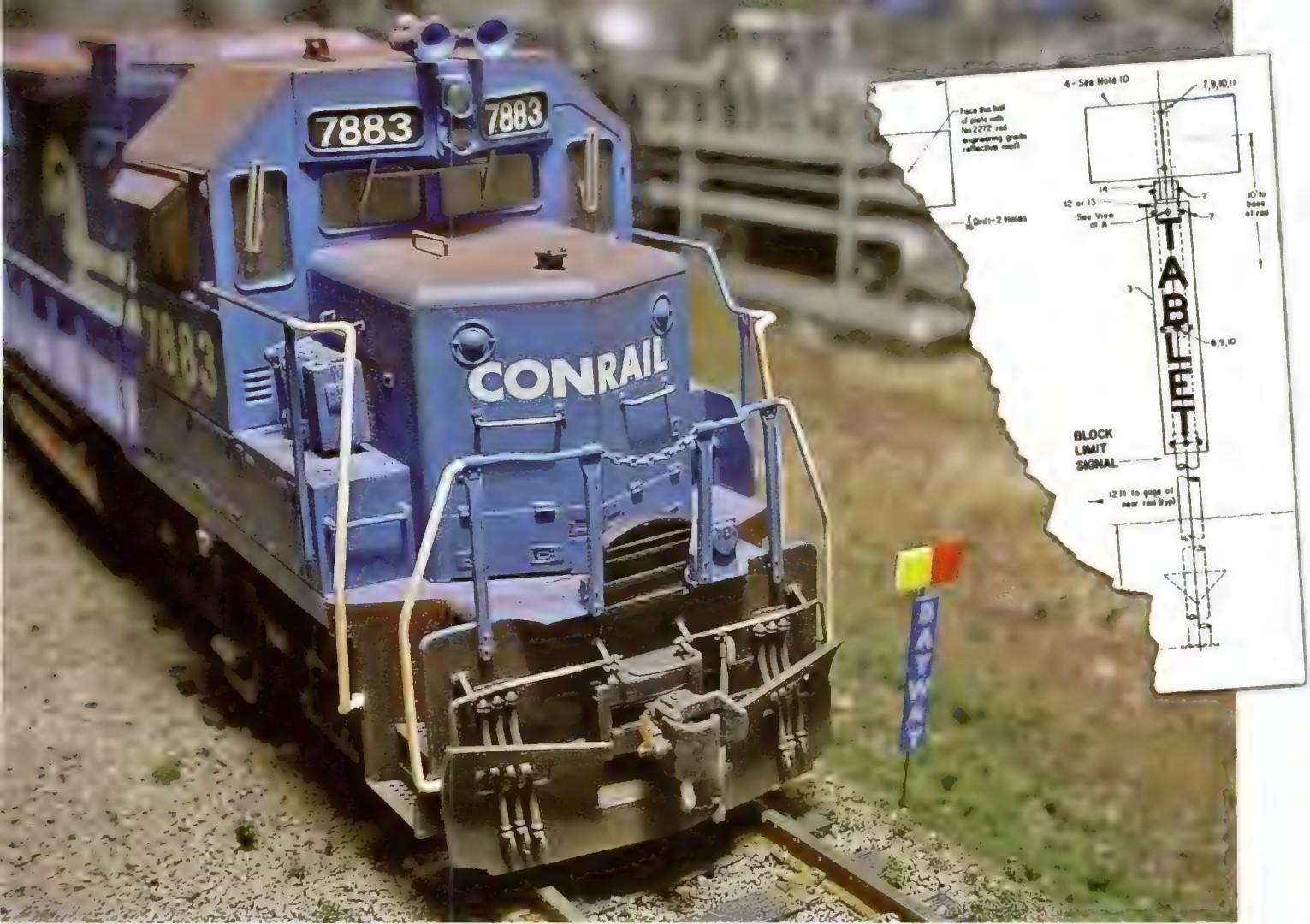
Normally the wire nuts were all red, but the dispatcher could walk around the layout and replace the red ones with green or yellow to clear ahead of trains. Then he could replace the red wire nuts to protect the rear of a train that had passed, and also use the yellow nuts to warn approaching trains of a red signal ahead.

The only cost was that of a few wire nuts, with no wiring or software. I didn't use double-headed wire-nut signals, but you could glue one nut on top of another if you wish.



In the later version of WDIS, David used colored disks glued to sticks. They looked more like signals, but were more delicate than the wire nuts.

A better-looking version used colored paper disks glued to silver sticks. The dispatcher could insert these in holes drilled in the plywood at the signal locations to "set" the signals as he wished. These look more like signals and allow two-head indications, but are more delicate to handle. Either version authorizes train movement by signal indication as on the prototype. – D.B.



Lineside details BY THE BOOK

Using railroad standard plan books enhances prototype modeling

By Matt Snell • Photos by the author

When I began modeling, I relied on photos and memory to model a location hundreds of miles away. But as I learned more, I quickly realized that what once seemed prototypical in my mind's eye no longer looked good enough to me.

This set me on a quest to make my lineside details more accurate. One of

the most useful tools I've found to aid me in this goal is a standard plan book for Conrail, the railroad I model.

Almost all companies – not just railroads, but from automakers to clothing stores to fast food chains – have standard plan books. Generally, the bigger the operation, the larger the book. The railroads' standard plan books include engineering drawings, similar to blueprints, for everything from light bulbs and signs to the most intricate of track and signal installations. They are invaluable to railroad shop and maintenance workers as well as to outside contractors employed by the railroad. For scale modelers, though, the standard plan book is underutilized as a modeling tool.

Prototypically accurate block-limit signs like this one increase the realism of Matt Snell's HO scale Conrail New Jersey Division layout. Matt referred to a Conrail standard plan book, an excerpt of which is seen in the inset, to help him improve these details.

While a standard plan book can be tricky to get [see "Where to find standard plan books" on the next page – Ed.], it can be a valuable reference, saving both time and money. Not only is it useful to those modeling a current prototype, it can be a necessity for those modeling a fallen-flag road that no longer affords the opportunity to see the real thing up close and personal.

One way a standard plan book can be used to aid in making a layout more realistic is prototypically accurate railroad signs. I'll share with you how I used my copy of the official Conrail C&S (Communications and Signals Dept.) Standard Plan book to enhance the realism of my own Conrail New Jersey Division layout.

Take a letter (or 26)

The beginning of any sign is the lettering. With tens of thousands of fonts available for our home computers, this is one area where a standard plan book can greatly simplify our quest for accurate modeling.

When I set out to model Conrail, the font style used by the railroad was not available in decal form. I would have to get custom decals made. The standard plan book provided me with exact A-Z and numeric samples to supply to the decal designer.

As I discovered, Conrail used two sizes of sign text – one for horizontally mounted signs, and a smaller size for vertical ones. I also found a different font that Conrail used for mileposts and other small lineside signs. Both can be seen in **fig. 1**.

Design for a sign

With decals in hand, I was now ready to start creating control point signs for the layout. I knew that the Control Point (CP) and Block Station lettering was mounted on a blue plate, but how big were these plates? And why were red and yellow plates mounted atop some station signs – did I need them, and if I did, how big were they?

Consulting the standard plan book once again, I found diagrams detailing both the horizontal signs I would be mounting on lineside structures and the freestanding signs mounted on poles beside the tracks. See **fig. 2**. With the knowledge that the vertical signs were 7" wide and the horizontal ones should be 9" tall, I was now able to select the correct sizes of styrene strip to make the signs. I chose .080" (which is 7" in HO scale) for vertical signs and .100" (8 3/4" in HO scale, close enough to 9" for me) for horizontal signs. Completing these signs would now be as simple as a little painting and lettering. I chose .010" thick styrene for signs that would be mounted on buildings and .015" strip for the pole-mounted ones, to make them a bit sturdier.

I clamped several long strips of both sizes in self-closing tweezers and airbrushed them with Floquil Conrail Blue. I let them dry hanging in the tweezers so the paint would not be marred, as it would be if I laid them flat to dry. Once the paint dried, I applied Testor's Glosscote in the same manner, giving them a glossy surface in preparation for decaling.

When the Glosscote was dry, I cut each strip into 4" sections and placed them on a cutting mat with a 1/8" grid pattern. I used blue painter's tape applied along the lower edge to keep each



Fig. 1 Fonts of information. In the pages of a standard plan book, Matt found charts of the alphabets Conrail used for lineside signs. He used them to have accurate custom decal sheets made.

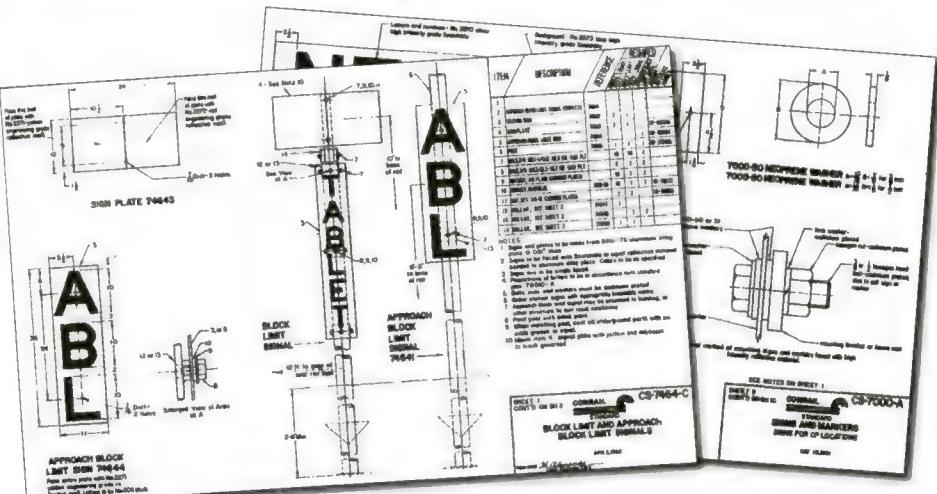


Fig. 2 Standard signs. Diagrams of Conrail's structure-mounted and pole-mounted lineside signs Matt found in a standard plan book helped him model these details more accurately on his layout.

Where to find standard plan books

Standard plan books

can help in modeling, but where do you get them? A quick Internet search found multiple railroad historical societies that list plan books either as part of their archives or for sale. While the archives are generally only available to members, this just adds one more reason to join a railroad historical society.

Other places they can be found are railroad-related Web sites run by private individuals, groups, and clubs. Many of these sites rely, Wikipedia-style, on readers to add whatever information they may have. These sites can be a trove of both prototype information and examples of modeling.

Finally, there are commercial Web sites like eBay. In addition to actual railroad-issued plan books, you can find compilation books and CD-ROMs offered by companies and individuals.

When looking for this type of material, try using search keywords such as "standard plans," "plans," "drawings," and "blueprints," along with the name of your railroad. In addition to a general Internet search, another good source of material is the National Model Railroad Association's Directory of Worldwide Rail Sites, at <http://www.nmra.org/directory/>. – M.S.



Fig. 3 The starting lineup. Matt taped styrene strips painted Floquil Conrail Blue to a cutting mat and used its grid to help him correctly space the decal lettering on his lineside signs.



Fig. 4 Mystery solved. Matt wondered what the red and yellow rectangle on top of some Conrail signs signified. The standard plan book told him they were block limit markers.



Fig. 5 Save your paint. Rather than paint his block limit indicators, Matt colored them yellow with a felt-tip permanent marker. He used decal film for the red half, then touched up the edges with a red marker.



Fig. 6 Before and after. At left is an example of Matt's old block limit signs, which he built from memory. After he consulted a standard plan book, Matt's new signs, like the one at right, are more realistic.



strip in place while I placed the individual decal letters. See **fig. 3**. After lettering each sign, I removed the tape and cut the strip to size with hobby knife fitted with a chisel-blade.

Topping them off

I now was ready to mount the signs on the layout – or was I? Looking at the standard plan book, I once again noticed the mysterious yellow and red rectangle atop the pole-mounted signs, the same ones I recognized from rail-fan photos like **fig. 4**. Looking over the diagram in the book, I learned that these indicated block limit signs.

Since several of my signs indeed marked block limits, I set out to model the red-and-yellow rectangle. Diagrams showed these plates to be 24" wide and 12" tall. I cut plates to size from .015" styrene sheet.

To make assembly go quicker, rather than painting the styrene, I colored it yellow with a permanent felt-tip marker. I colored the red half using decal trim film, then touched up the edges with a red marker. See **fig. 5**.

Placing the signs

With my signs and block markers ready, I again consulted the plan book to find how high to mount them, and how far from the track. I learned that the center of the two-color block limit rectangle should be 10 feet above the base of the rail and 12 feet horizontally from the nearest rail.

Now I could assemble the sign onto a pole and mount it on the layout. I cut .015" K&S brass wire into scale 16-foot sections, painted them black, and attached the signs and the block-limit rectangles with cyanoacrylate adhesive (CA). I drilled mounting holes on the layout, then cemented each pole into its hole at the correct height.

The left-hand photo in **fig. 6** shows my original lineside sign, which I made without consulting any plans. Compare that to my new prototypically correct sign on the right, modeled with the aid of the standards book. As you can see, using a standards book can not only help make your modeling more prototypical, but it can also have a substantial visual impact on your layout. **MR**

Matt Snell works for a trucking company in West Chester, Ohio. He has been modeling Conrail's New Jersey Division since 1994. He wrote "Updating an Amtrak F40PH for the 1990s" in the July 2009 Model Railroader, and his HO scale layout appeared in Great Model Railroads 2006. With his wife, Debie, he has produced several videos on Conrail.



Maurice B. Quirin's photo of two trains meeting at Dante, Va., captures a typical 1976 day on the Clinchfield RR.

Big-time coal hauling in a spare room

This 9 x 11-foot HO Clinchfield branch line can handle 25-car coal trains

By Dan Bourque

A room-sized layout is a serious design challenge for many model railroaders, especially if you enjoy Appalachian coal traffic with long, heavy trains, six-axle diesel lash-ups, and pushers. At first glance, it seems that it's impossible for a small space to handle large locomotives and strings of hoppers. But rather than abandoning big-time railroading, I resolved the space dilemma by modeling the Haysi RR, a small branch line that served the Clinchfield RR, a Class 1 main line.

As a prototype modeler, I'm always trying to balance the space required to

model a prototype against the reality of a cramped layout room. The trick is to aim low – pick a small area to model and develop an uncluttered track plan that models the key features well. My plan for a bedroom-sized Haysi RR layout captures every industry and loader on the line, while still leaving a little running room between scenes.

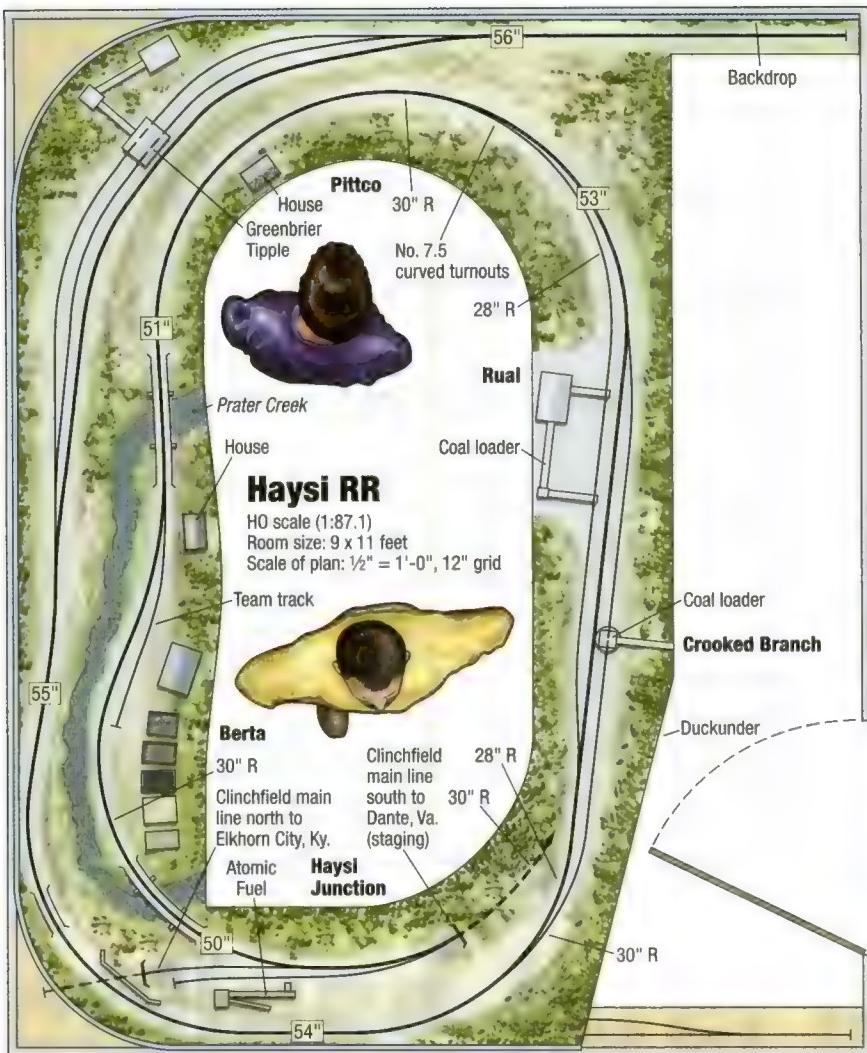
Haysi history

The five-mile long Haysi RR was constructed in the coalfields of western Virginia in 1970 by the Clinchfield RR's management. The Haysi was kept

separate from its parent to allow operation by non-union crews. Nevertheless, the Haysi was operated just like any other coal branch of the Clinchfield.

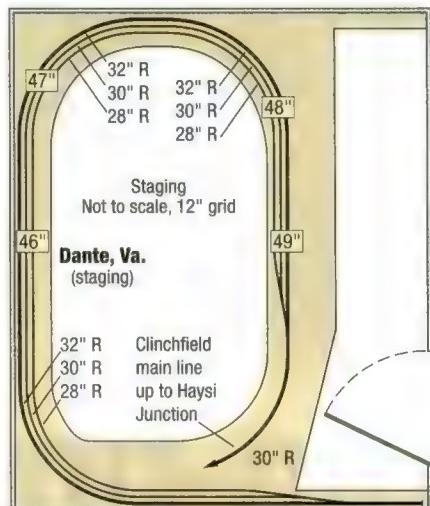
The Haysi connected to the CRR at its namesake, Haysi, Va., where it squeezed onto the main line between two tunnels a mere $\frac{1}{4}$ mile apart. From there, the Haysi wound up the tortuous curves of Prater Creek with grades as steep as 2 percent to serve the large Greenbrier coal tipple at the end of the line in Pittco.

Two more sizeable coal loaders, Rual and Crooked Branch, were constructed along the line in the mid-1970s. Though



The track plan at a glance

Name: Haysi RR
Scale: HO (1:87.1)
Size: 9 x 11 feet
Prototype: Haysi RR (Clinchfield RR)
Era: 1976 to 1980
Style: Walk-in
Mainline run: 47 feet
Minimum radius: 28"
Minimum turnout: no. 6
Maximum grade: 2 percent
Height: 50" to 56"



Illustrations by Rick Johnson and Theo Cobb

Clinchfield crews and power served the line, the Haysi did own a locomotive, an ex-Clinchfield F7B (an upgraded F3B) no. 852. The yellow B-unit, dubbed "Haysi no. 1", was equipped with remote control to position cars for loading at the Greenbrier Tipple.

Prototype operations

Operations on the Haysi were straightforward. The Greenbrier Turn was assembled at Dante Yard, Va. With more than 70 empty hoppers, the turn ran north 24 miles to Haysi with three six-axle locomotives, two on the point and one pushing on the rear.

In the 1970s, the Clinchfield used mainly SD40s, SD45s and SD45-2s on this train. Occasionally, leased units including maroon Duluth, Missabe & Iron Range SD18s joined the fleet. Once on the Haysi, the head-end power would place empties at all the tipples heading up to Greenbrier. Then the train would head back down the branch with the Greenbrier loads. Rather than turn the power, the pusher would lead

home and pull the loads from the other tipples on the way back.

When switching chores were complete, the turn would haul more than 70 loaded hoppers south. Along the way, the turn would drop off some of the cars to be processed at the enormous Moss no. 1 prep plant on the Clinchfield's Fremont Branch. The remainder would be hauled back to Dante. Between turns, the Haysi B-unit would shuffle cars for loading at the Greenbrier Tipple.

The track plan

For the track plan, I chose 1976-1980 as the period because it offers the most coal loaders and operation. Dante, Va., is represented by a three-track staging yard underneath the layout. Just like the prototype, the Clinchfield main line exits McClure Tunnel, passes through the town of Haysi (also known as Berta), and enters Russell Tunnel shortly thereafter. In the few feet between the tunnels lies the short siding for the tiny tipple known as Atomic Fuel and the switch for the Haysi RR. Berta was served by

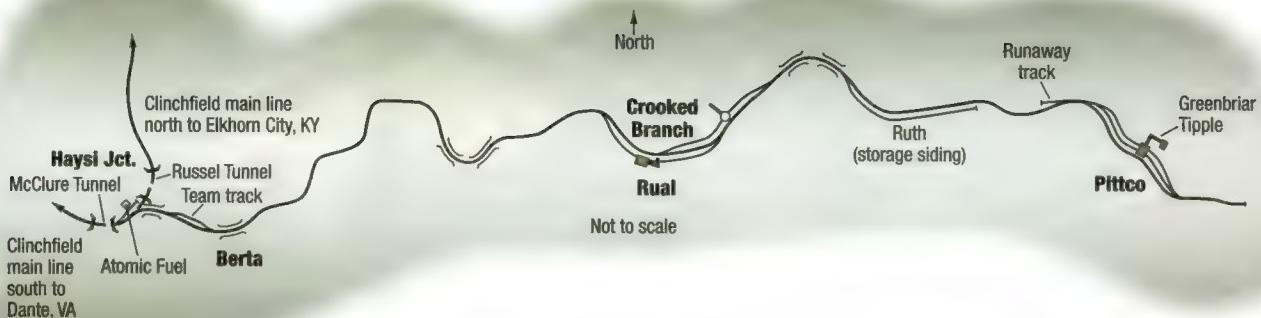
a single team track bracketed by two bridges. Up the line, the sidings for Rual and Crooked Branch overlap each other on opposite sides of the branch. Along the line, numerous bridges, cuts, and sharp curves represent the rugged profile of this branch. At the end of the line is Greenbrier Tipple, a large structure that straddles two loading tracks.

Due to the small room, a few concessions had to be made. The first is the use of a duckunder. To mitigate the negative effects of the duckunder, it's less than 18" wide and is well off the floor. It can also be made into a lift-out if desired. Once in the middle of the layout, the space for operators is a generous 42" wide and will accommodate two easily.

The second concession is minimum radius. Normally, at least a 30" radius is desired for appearance. The absolute minimum that I would recommend for running six-axle locomotives is 24". For this layout, I used a 28" minimum as an acceptable compromise.

The prototype branch line used heavy rail, so code 83 track is close to perfect

Haysi RR



for the layout. All turnouts are no. 6 (Atlas code 83) with a few exceptions as indicated on the track plan. The tight spaces require a few curved turnouts (Walthers/Shinohara Code 83 no. 7.5).

To increase the running distance and space between scenes, I wrapped the track around twice (three times if you include staging). I used the prototype's 2 percent grade in many sections, which helps separate the two levels by elevating the track toward the back of the layout. Also, I avoided stacking major scenes on top of one another to increase the feeling that the two levels are separate areas. There's enough running room between levels to keep long trains from overlapping themselves on different levels.

Layout operation

Operation on the Haysi could keep one or two people busy for a couple of hours. Much like the prototype, the daily train would leave Dante, switch the team track at Haysi, drop off empties all the way up the branch, and then collect loads all the way back down before returning to Dante.

Each coal loader's track includes room for loads below the tipple and empties above it. In prototype fashion, the empties are dropped at each tipple on the outbound trip and loads are left to be picked up return. If you desire to do some additional switching, you can sort the loads for Dante Yard and Moss no. 1 prep plant.

Though the layout is small, the trains are still long enough. The layout will easily accommodate a 25-hopper train with three locomotives and a caboose. For motive power you can use any three Clinchfield six-axle diesels (SD40s, SD45s, or SD45-2s).

For this layout, Digital Command Control (DCC) is a must. Because the prototype used a helper in both directions, you can have two operators run the turn. The challenge is that if the helper



In addition to the large mines, the Clinchfield served dozens of small truck-loaded tipples. This is the Holly Creek Tipple on the Fremont branch. Jim Hediger photo

pushes too hard, the cars accordion off the track; push too light and cars fall in at the corners. A solo operator could use the head-end power with no helper, but if you're adept at DCC, you might try consisting the helper with the head-end engines.

Variety comes in the form of leased power. Imagine three Duluth, Missabe & Iron Range SD18s on the point of a coal train running through rural Virginia on your layout – it's prototypical! The team track at Berta adds a little variety to endless coal traffic.

Finally, if running the Greenbrier Turn doesn't fully scratch your operations itch, you can always move hoppers

through the Greenbrier Tipple with the Haysi B unit. Coincidentally, you'd be doing this via remote control from outside the engine, just like the real thing!

The Haysi RR offers some big-time railroading in a compact form. Even if you don't choose to model the Haysi, it serves as a good example of one way to fit big trains and prototype modeling into areas that seem too small. **MR**

Dan Bourque is an officer in the United States Air Force and is building a layout based on the Interstate RR. He runs appalachianrailroadmodeling.com, a Web site for modelers interested in eastern coal-hauling railroads.



With the right detail parts, you can convert a stock locomotive into a stand-in for your favorite prototype. Jack Burgess describes how he re-detailed two Bachmann HO scale 4-4-0s (see inset photo) to more closely match Americans used on the Yosemite Valley RR.

Re-detail a modernized American

Convert an HO scale Bachmann 4-4-0 into a stand-in for a Yosemite Valley RR engine

By Jack Burgess • Photos by the author

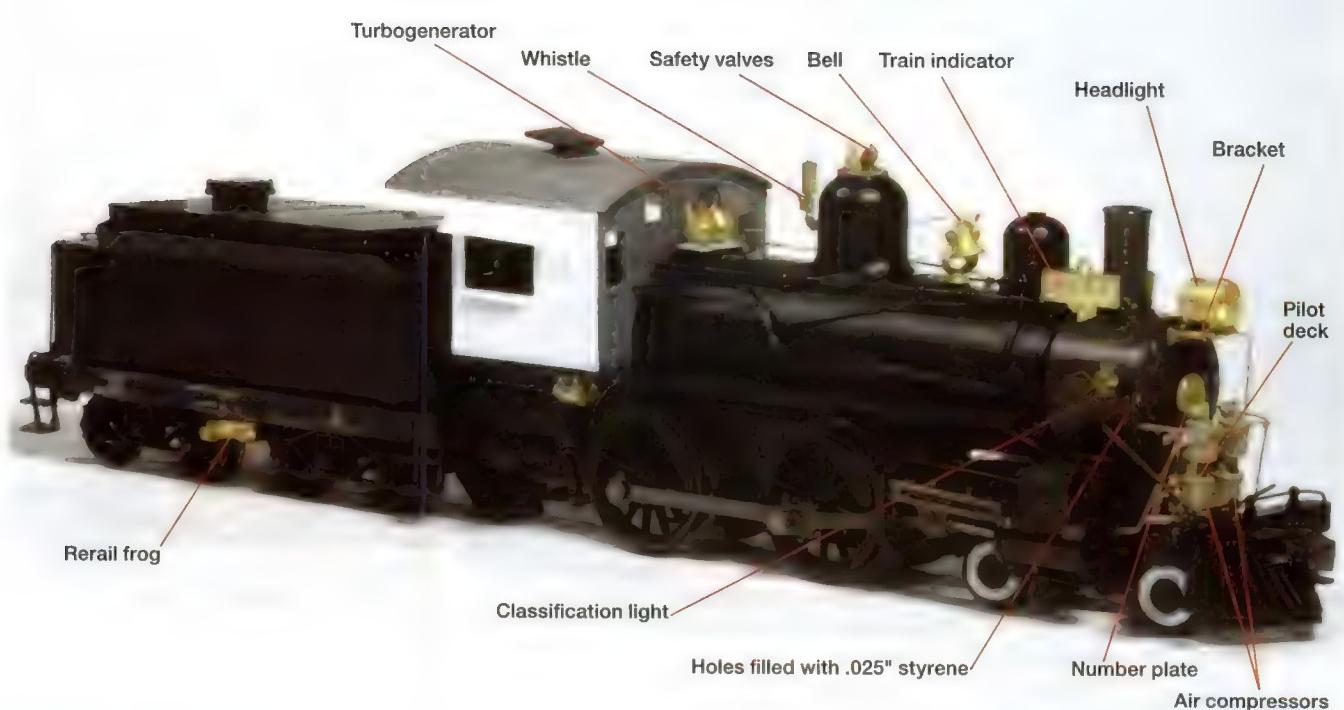


Fig. 1 It's all in the details. Jack replaced many of the Bachmann model's plastic details with an assortment of brass castings. He used styrene rod and putty to fill the holes where the original parts were removed.

Many of us have been here before. We model a railroad with a small locomotive roster. Most of the engines have been offered commercially, but there are a few we're waiting for. Scratchbuilding can take considerable time, but with a bit of effort, we can convert close enough ready-to-run engines into reasonable stand-ins of our favorite prototype. I did the latter for Yosemite Valley RR 4-4-0s nos. 22 and 23.

The two Americans on the YV saw limited duty in August 1939, the period I model. They were used occasionally in passenger service during the summer months, and in yard service. The locomotives were limited to three-car passenger trains on sections of the railroad in the Merced River canyon where the grade was 1.5 percent or greater. In later years, they were assigned to short winter passenger trains that had only a Railway Post Office and observation car.

Much like on the full-size railroad, my 4-4-0s would see limited use. The two re-detailed Americans would complete my YV roster circa August 1939, joining the five imported brass Beaver Creek Models 2-6-0s I acquired in the 1980s. Fortunately, Bachmann released an HO scale Maryland & Pennsylvania 4-4-0 in its Spectrum line. It represents a locomotive built around the turn of the 20th century and later upgraded.

After looking at the ads, it appeared that the Spectrum locomotive could be

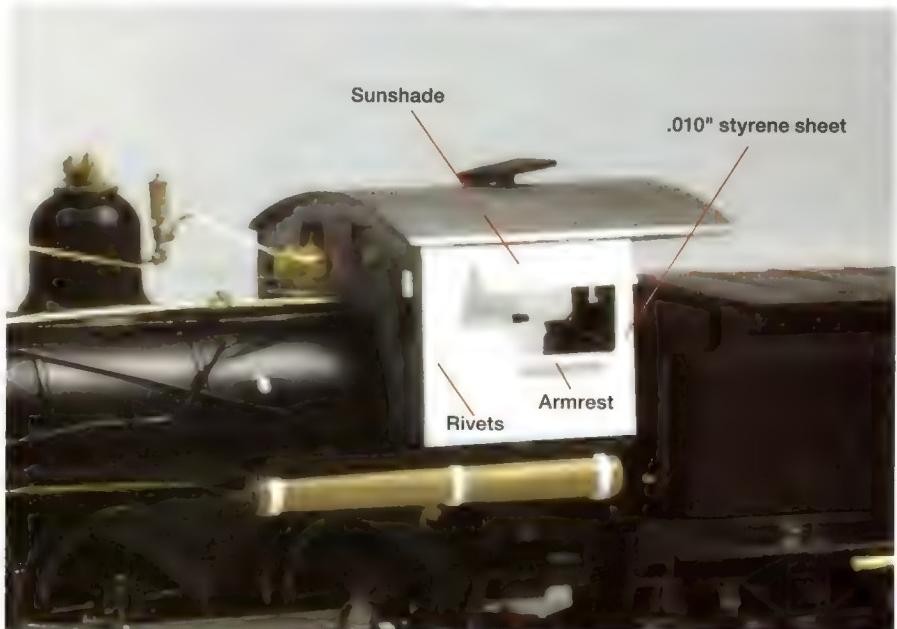


Fig. 2 Styrene sides. To preserve the weight of the die-cast metal cab but not compromise on the details, Jack made new cab sides from .010" styrene, which he detailed and attached to the sides of the original.

used as the basis for YV Americans 22 and 23. The March 1965 issue of *Model Railroader* featured plans for one of the Ma & Pa 4-4-0s. To compare the Ma & Pa engines to those on the YV, I photocopied the drawing onto transparent overhead projector film at the same scale as the drawings of YV no. 22 that I drafted for the May 2005 MR. Over-

laying the drawings revealed a number of differences between the engines, but they were close in length, wheelbase, and driver size. This confirmed that redetailing the Bachmann model would work until I have time to scratchbuild accurate YV models.

Bachmann offers the 4-4-0 with prototype-specific cabs, valve chests,

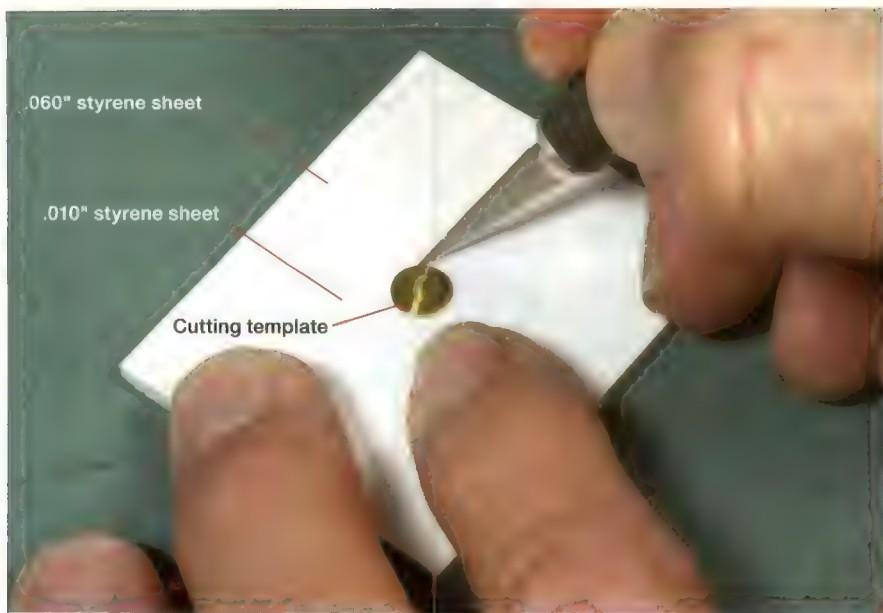


Fig. 4 Cutting the rings. With the holes for the hub in alignment, Jack inserted the narrow end of the template into the opening. He used a fresh no. 11 blade to cut out the styrene ring following the template.

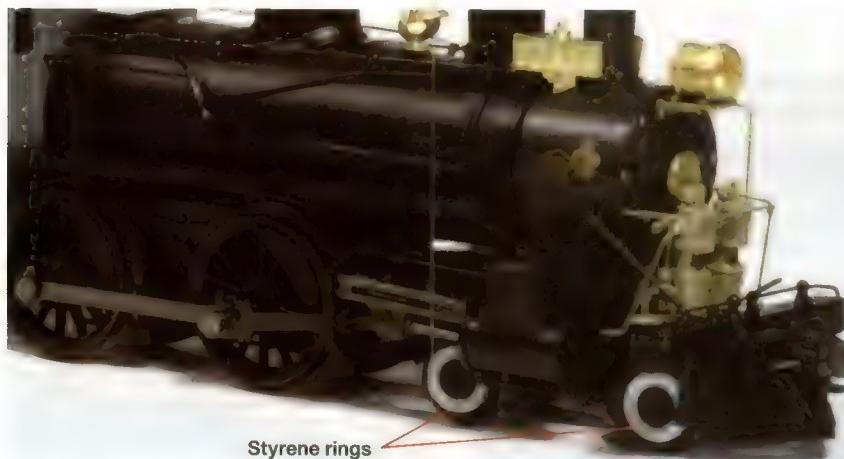


Fig. 5 Rings installed. Jack attached the styrene rings to the metal wheels with a plastic-safe cyanoacrylate adhesive. Once the locomotive is painted, it will be hard to tell the pilot wheels originally had spokes.

and air tanks. In August 1939, the period I'm modeling, the YV engines still had frame-mounted air tanks and slide valves, but sported steel cabs, boiler-tube pilots, and front and rear electric lights powered by a turbogenerator. Both engines had air compressors, but no. 23 (shown on page 40) carried hers on the pilot deck instead of on the left side of the boiler.

For my prototypes, selecting models with the correct slide valves is the most important option, since the piston-valve models also have long running boards and front ladders that are incorrect for the YV. With two Bachmann ready-to-run models in hand, it was time to start re-detailing these modernized Americans.

Disassembly and detailing

I started by disassembling the locomotives. First, I removed the die-cast metal cab, which is held in place with two screws concealed under the running boards.

Next, I turned my attention to the boiler, which is held in place by three screws. The first, located directly under the smokestack and cylinders, is easy to find. The other two screws are under the cab and somewhat concealed by the brake cylinders.

Since there are a number of different size screws used on the engine, I recommend putting each screw or set of screws in small, labeled plastic bags so you know where to put them when reassembling the model.

Finished cutting template

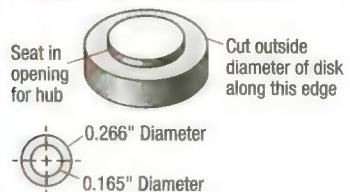


Illustration by Rick Johnson

Fig. 3 Cutting template. Jack made a cutting template so he could cover the spoked pilot wheels with styrene rings. Though Jack turned his brass template on a lathe, you could make it with an electric drill and a file.

With the models disassembled, I was ready to begin adding and replacing details. Most of the changes were simple, such as replacing the plastic details with sturdier brass castings and adding missing appliances, as noted in **fig. 1** on the previous page. Some of the brass parts had to be moved to match YV prototypes, which meant I needed to fill holes.

In most locations this was an easy task. However, removing and modifying the handrail posts on the smokebox front was more challenging, since the holes are close to the molded rivet detail. Instead of using putty to fill the holes, I enlarged the openings with a no. 73 bit. Then I used .025" styrene rod and styrene-compatible cement to fill the holes. Once the cement had dried, I cut the excess styrene off with a sprue cutter for a seamless repair. See **fig. 1**.

My models of nos. 22 and 23 show how the YV modified its steam locomotives over the years. In 1938 or 1939, no. 23 was fitted with a shorter smokebox, and the two air compressors were moved to the pilot deck. I was able to shorten the smokebox by cutting and filing it.

Though I didn't have to modify the smokebox braces, I did have to make the air compressors and related plumbing removable, since the boiler couldn't be reinstalled if the pumps were permanently mounted on the pilot.

I also had to make the sloped pilot deck flat using brass stock. I bent a piece of sheet brass to the angle necessary to compensate for the slope. Then I soldered brass angle to the rear of the sheet. I also soldered the air compressors to the angle plate and added the piping. To hold the assembly in place, I threaded a 1-72 screw through a hole in the pilot and into the brass plate.

Going beyond the basics

Upgrading details helps refine these models, but there were bigger changes

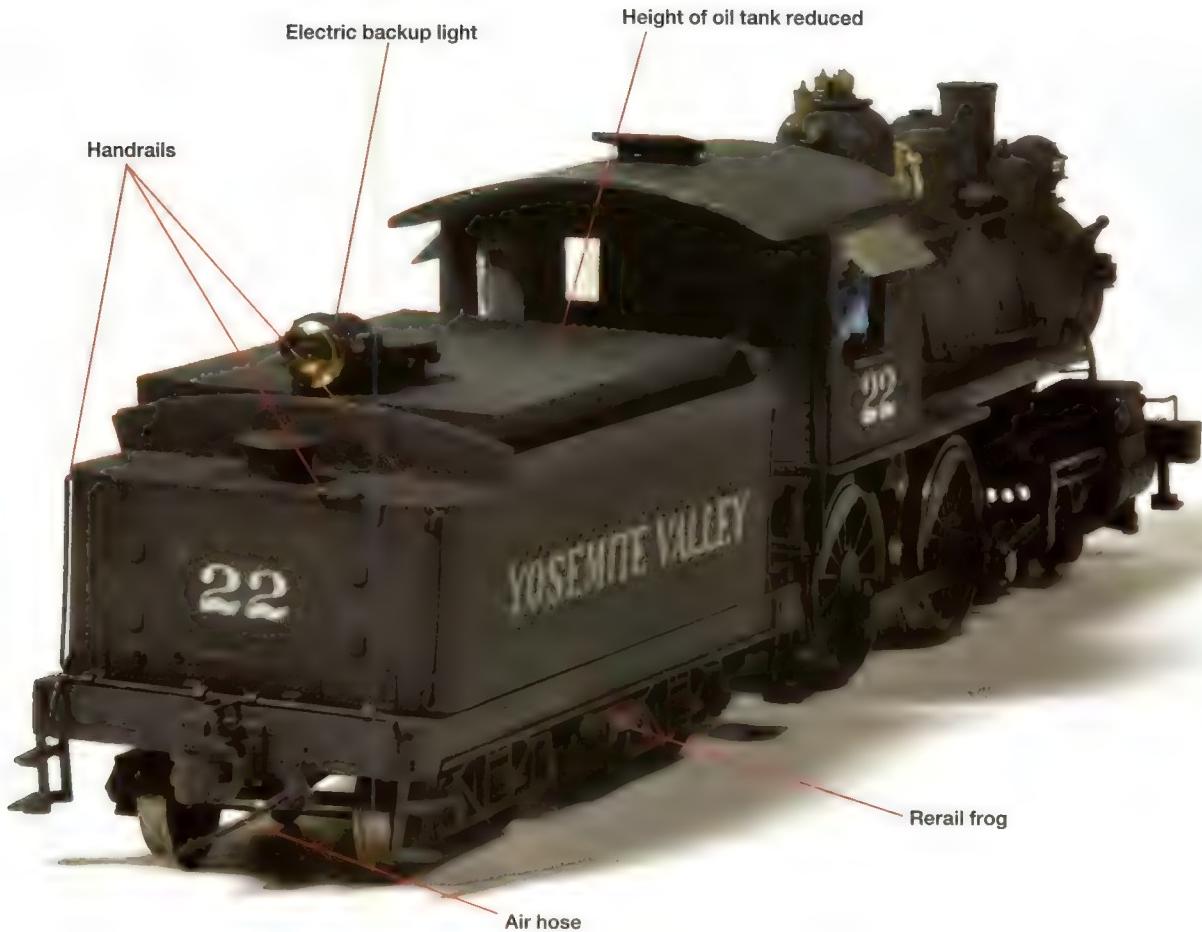


Fig. 6 Tender modifications. Jack made the tender look more like the YV prototype by lowering the height of the oil tank, placing handrails in the correct locations, and installing an electric backup light.

that yielded more authentic stand-ins for the YV prototypes.

The first of these modifications was made to the cab. The full-sized YV engines had plain steel cabs with relatively large window openings. The Bachmann American has a die-cast metal cab (and boiler) that gives the model extra weight and pulling power. I could have simply removed the window mullions or made a new cab from styrene. The former would be quite a compromise, and the latter would eliminate the valuable weight of the die-cast metal cab. To preserve the weight but not compromise on the details, I made new cab sides from .010" plain styrene sheet, as shown in **fig. 2** on page 65.

Before installing the styrene sides, I stripped the paint off the cab with Testor's Easy Lift Off [Use this product in a well-ventilated area and follow the manufacturer's instructions. —*Ed.*] and used a file to remove the rivet detail, sunshades, and armrests. I also removed the center post between the two cab windows.

I then used a milling machine to make the window openings on the cab slightly larger than the YV prototypes. If you don't have a milling machine, a motor tool and file will work.

Next, I laid out the .010" styrene sides and drilled holes at the four corners of each window opening. Trying to cut tangent openings in line with these holes with a hobby knife proved to be difficult. Instead, I cut short of the holes and enlarged the openings with a flat jeweler's file. I used a "blind" file, one without teeth on one edge, so I could work right up to the corner. I finished the cab sides by embossing the styrene with NorthWest Short Line's Riveter. [You could use Archer Fine Transfers rivet decals instead. Visit www.archertransfers.com to see the firm's product line. —*Ed.*]

I attached the finished styrene sides to the die-cast metal cab with cyanoacrylate adhesive (CA). Once the CA dried, I smoothed the joints between the top of the sides and the cab roof with a file.

To match the prototype (and protect the styrene from being damaged), I added styrene bracing to the cab interior. I completed the cabs on both locomotives by adding styrene armrests and cab sunshades, shown in **fig. 2**.

Pilot wheels

In the 1930s the YV Americans had solid pilot wheels, which meant I needed to change the spoked wheels on the Bachmann model. I initially purchased replacement wheelsets from Precision Scale Co., but they were the wrong diameter. So I cut styrene rings to cover the spokes.

To make the rings, I cut four small pieces of .010" styrene, about $\frac{1}{2}$ " square. Then I used a no. 18 bit to drill a hole in a piece of .060" styrene about the same size. I marked the center on each piece of .010" styrene with a pencil, and then placed it on a piece of wood. I covered the .010" styrene with the .060" styrene, centering the latter over the pencil mark. After I clamped the pieces of styrene and piece of wood together, I drilled the



Replacing the locomotive decoders

I initially replaced the factory-installed Digital Command Control decoder with a Micro-Tsunami model TSU-750 from SoundTraxx. However, the micro decoder overheated and shut down after running a short time due to the current draw of the motors, something I didn't check ahead of time. I replaced the micro decoder with SoundTraxx's larger TSU-1000.

Replacing decoders requires attention to detail as the locomotive manufacturer's wiring colors may vary from the National Model Railroad Association's recommended practices.

Before I unsoldered the wires from the factory-installed decoder, I marked the red wire from the decoder for the motor (it's connected to the center of the printed-circuit board) with gray paint to differentiate it from the red wire used for right rail pickup.

In addition, both tender trucks have black wires that connect to the printed-circuit (PC) board. The rear truck is a left rail pickup and should be connected with the red wire for the right rail pickup from the engine. The front truck is a left rail pickup.

Since my locomotives have non-operating headlights, I didn't need the decoder's lighting wires. To prevent a short circuit, I trimmed all of the unused wires, the first one about $\frac{1}{4}$ " long and the subsequent ones slightly longer so the ends wouldn't touch. I wrapped the wires and taped them to the decoder with electrical tape.

I used Litchfield Station model SP-28R-08 round 1.1" speakers for my engines. I glued the speakers over the slots in the floor of the tender. Then I cut and cemented .040" styrene sheet adjacent to the edges of the speaker to cover any slots not masked by the speaker. I also removed the posts molded into the tender floor that held the original PC board in place so I'd have more room for the replacement decoder.

After soldering the decoder wires to the appropriate Bachmann wires, I placed the decoder into the top of the tender/oil tank and attached it (and the capacitor) to the shell with electrical tape.

Finally, I plugged the wires from the tender into the socket in the locomotive to determine how much slack would be required when they were connected. I pulled the excess wires into the tender and used electrical tape to hold them in place. – J.B.

opening for the hub through the hole in the .060" styrene.

Cutting the outside diameter of the ring was a bit more challenging. I had to make a cutting template, shown in **fig. 3** on page 66, from brass rod. Though I turned the rod on a lathe, you could mount the brass in an electric drill and reduce the diameter with a file.

To use the cutting template, I placed the .060" styrene on the workbench with

one of the .010" rings on top. I made sure the holes for the hub were in alignment.

Next, I inserted the .165" end of the cutting template through the opening for the hub, holding the brass tight against the .010" styrene. Then I used a hobby knife with a fresh no. 11 blade to cut the outside diameter, as shown in **fig. 4**. I attached the styrene rings to the metal wheels with plastic-compatible CA, as seen in **fig. 5**.

Fig. 7 Finished models. Here we see completed YV 4-4-0s nos. 23 and 22. In this view, you can see some of the detail differences between these two locomotives, such as the location of the air compressors.

Tender modifications

After detailing the engine, the tender modifications were fairly easy. I removed several details, including the truck chains and hangers, eyebolts on the trucks, coal and wood loads, rear footboards and supports, rear full-width handrail, and pole. Then I filled the resulting holes with putty, let it dry, and filed the surfaces smooth.

I installed grab irons on the rear end sill per the prototype. Since the sill on the model is die-cast metal, you may want to use a small drill press to drill the holes for the grabs.

I made new hangers for the derail and pole using .015" x .042" flat brass, available from Detail Associates. I soldered the details to the hangers and attached the hangers to the inside of the side sills with CA. Then I added an air brake hose to the right of the rear coupler. I also reduced the height of the oil tank to more closely match the prototype. See **fig. 6** on the previous page.

Unfortunately, the flare along the top edge of the tender extends only to the rear of the oil tank. On the prototype YV 4-4-0s, the top edge was flared on three sides. I spent considerable time using a computer-aided drawing program trying to replicate this feature, but finally gave up on the idea.

Painting and lettering

I used Easy Lift Off again, this time to remove the Ma & Pa lettering. Before painting the locomotive, I disassembled the boiler and frame and removed the cab and motor assembly. I unsoldered the motor wires from the printed-circuit board, carefully documenting their locations for reassembly.

I first sprayed the cab interior with Floquil Light Green. As the paint was

► Materials List

Bachmann
83401 Ma & Pa 4-4-0 locomotive

Cal Scale
202 headlights (2)
211 generator
245 number plate
246 headlight bracket
247 safety valve
250 whistle
256 air compressors (2)
281 bell
312 classification lamps

Cary
178 train indicators*

Evergreen styrene
9005 .005" clear sheet
9010 .010" sheet
9060 .060" sheet

Floquil paint
110010 Engine Black
110011 Reefer White
110020 Caboose Red

Kadee Quality Products Co.
438 air hoses

Microscale
114 Kristal Kleer

M.V. Products
185 headlight lenses

Precision Scale
3110 rerailed frog
3404 air equalizing reservoir
31046 main air reservoir (left side)
31575 pole

Testor Corp.
542143 Easy Lift Off

Miscellaneous

Brass wire and sheet
Future floor polish
Yosemite Valley decals
(www.yosemitvalleyrr.com)
*Cary train indicators are larger
than the ones used by the YV, but I
couldn't find a better option.

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drying, I masked the wheels on the pilot truck, the drivers, and the tender trucks. I also masked the truck axles on the tender. I then painted the locomotive and tender Floquil Engine Black mixed with some Reefer White. I kept the drivers rolling while applying the paint so I wouldn't have to disassemble the frame. Once the boiler was dry to the touch, I used lacquer thinner to clean up any overspray.

I let the black paint dry for two days and then masked the cab so I could airbrush the front windows with Floquil Caboose Red. I brush-painted the armrests, pole, derail, and number plate the appropriate colors.

Once all the paint had dried, I used an airbrush to apply Future floor polish to the areas that needed decals. Though Future is a floor polish, it also provides a smooth, glossy surface for applying decals. I let the Future dry for 24 hours before adding decals. After the decals had dried, I applied Testor's Dullcote to seal them.

I installed .005" clear sheet styrene window glazing, which I cemented in the cabs with Microscale Kristal Kleer. I also used the Kristal Kleer to suggest glass in the class lights and to cement the headlight lenses in place. I then added new crew figures to the cabs, before reattaching the cabs to the locomotives. To finish the models, I sprayed the engines with a light weathering

Jack Burgess models the Yosemite Valley RR in HO scale. His article on scratchbuilding a handcar house appeared in the March 2009 MR.

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Want to see the articles on the Maryland & Pennsylvania and Yosemite Valley 4-4-0s, including prototype drawings? Then visit our Web site, www.ModelRailroader.com.

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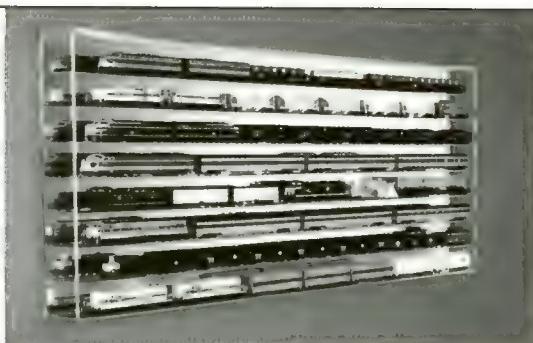
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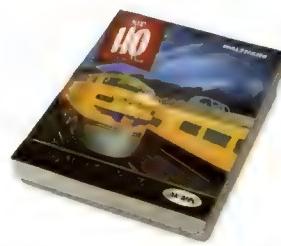
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Consisting and locomotive headlights



On today's railroads, most diesel-powered trains run with multiple units controlled by a single engineer. Part of the reason diesels replaced steam locomotives was that the tractive effort of the diesels can be matched to the train's weight simply by adding or subtracting locomotives. On our layouts, running multiple locomotives together with Digital Command Control (DCC) is called consisting, and it can be accomplished in several ways. This month, I'll focus on how to control diesel locomotive lighting effects in a consist.

Same address. The simplest way to run multiple units together with DCC is to program the decoders in each locomotive to the same address. This is most efficient with a permanently coupled set of locomotives, such as an A-B-A set of F units. For instance, I have a set of F3s numbered 2200A, 2200B, and 2200C. Since I use four-digit addressing on my layout, I like to have the decoder address match the unit's road number, so I have the 2200 part covered. The A, B, and C part is a bit of a problem because that's more than four digits.

I could assign the units decoder addresses 2201, 2202, and 2203, but I also have a locomotive numbered 2201B, so that won't work. And, I don't want these units to be

exceptions to my rule of matching the decoder address to the road number, making it difficult for my operators to figure out how select these engines.

To solve my dilemma, I used a drawbar to permanently link the units and assigned the three-unit consist the address 2200. The rear unit is facing the opposite direction, so I had to reverse its direction using Configuration Variable (CV) 29. Now all of the locomotives respond to the information packets addressed to 2200.

Controlling the headlights and Mars lights in the A units is still a problem. I don't like directional lighting because it isn't prototypical, but I made an exception in this case. I felt it was a good compromise, since the A-B-A set is rarely used for switching. When the 2200A is leading, its headlight is lit and the trailing 2200B's headlight is off. The lighting effect is opposite when 2200B is on the point.

I used F1 to control the Mars light on 2200A, and F2 to operate it on 2200B. I wrote this on the engine cards for the A-B-A set so operators know how to activate the Mars light.

Universal consisting. Some DCC systems, such as Digitrax, use universal consisting as the primary method of consisting. Locomotives

This month, Mike Polsgrove explains different methods of operating locomotive headlights in a consist. Bill Zuback photo

with different addresses can be controlled as one unit. In this method, the DCC system's command station keeps track of which units are in a consist.

Each manufacturer has a different method for universal consisting. On my NCE system, it's called old style consisting. Despite the name, it has some advantages, especially for lighting effects. Since the command station keeps track of the consist, it sends the same speed and direction (or the reverse direction in the case of a locomotive running backwards) information packet to each locomotive. Function and lighting information is sent only to the lead locomotive, so only its headlight is lit.

The disadvantage of universal consisting is that when the locomotive reaches the end of its run, you must break the consist and remake it with the last locomotive in the consist as the lead unit. Some systems have a limit on the number of locomotives that can be put in a consist with universal consisting.

Advanced consisting. A third method of consisting is called advanced consisting. In this method, CV19 is programmed to

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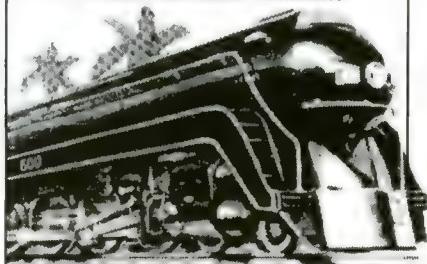
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the same two-digit address in all decoders in the consist. When a non-zero number is programmed into CV19, the decoder responds not only to its active address (either the two-digit address in CV1 or the four-digit address in CVs 17 and 18, whichever is selected by CV29), but the two-digit address programmed into CV19.

You can't use the same two-digit address for an individual locomotive and a consist, otherwise the single unit will respond to the information packet sent to the consist. I don't use two-digit addresses on my layout, and my DCC system remembers which two-digit consist addresses I've used, so I don't have to worry about this. However, advanced consisting can make lighting a bit more difficult.

Since the same address in the DCC information packets are sent to all decoders in the consist, all of the locomotives will respond to functions in the same way. Packets sent to the locomotive's non-consist address still control its functions.

Having all of the locomotives respond to the consist address is an advantage if only one unit has sound, as the horn and bell will sound no matter where the engine is in the lash-up. When it comes to lighting, having all units respond to the consist address can be a disadvantage.

One tedious option is to select each locomotive individually, set its lighting, and then run the consist. This is where CV21 and CV22 (not available in all decoders) come to the rescue. Configuration Variable 22 controls whether a locomotive's headlights respond to an information packet sent to the consist address. Configuration Variable 21 controls whether or not the locomotive responds to the F1 through F8 function packets.

It's easier to understand how to program CV21 and CV22 if you understand how CVs work. A CV is divided into eight pieces, called bits, numbered 0 through 7. Just like a computer, each bit can have either a high (some voltage) or a low (no voltage). These are sometimes called ones (high) and zeros (low), and a specific value is

assigned to each bit. Bit 0 has the value of 1, Bit 1 has a value of 2, Bit 2 has a value of 4, and so on. Each bit is worth twice the value of the bit proceeding it. For example, if Bit 1 has a voltage (a one) and all the other bits are 0 volts (a zero), the value of the CV is 2. By adding up all 8 bits in a CV, any value between 0 and 255 can be assigned.

In CV22, Bit 0 determines if the forward headlight is controlled by packets sent to the consist address or not. If your locomotive is set up for directional headlights using F0 (default in most decoders), a one (CV value of 1) in Bit 0 means that it's controlled by the consist address and a zero means it isn't.

Bit 1 controls the rear headlight. If a value of 3 – the sum of Bit 0 (value of 1) and Bit 1 (value of 2) – is programmed into CV22, the front and rear headlights will be controlled by the consist address.

Some decoders also use Bits 2 through 7 for functions above F8. A value of 0 programmed into CV22 means that neither the front nor rear headlights are controlled by the consist address. Likewise, CV21 controls how the locomotive responds to F1 through F8. Function 1 is controlled by Bit 0, F2 is controlled by Bit 1, and so on.

Advanced consisting may sound complicated, but once it's set up, you may never have to change it, even if the consist is broken and the locomotives are used in other lash-ups. On my NCE system, function packets are sent to the consist address and the lead locomotive's address. Therefore, if the lighting functions are disabled in CV21 and CV22, the lighting in the lead locomotive still responds to function commands.

Controlling lighting in a consist can be done differently depending on the type of consisting used. However, it's possible to have realistic locomotive lighting effects with the three methods presented here. **MR**

Send your questions about Digital Command Control to DCC Corner, *Model Railroader* magazine, P.O. Box 1612, Waukesha, WI 53187, or e-mail dcc@mrmag.com. We regret we can't answer all the questions we receive.

Product Reviews



Bachmann GE 45-tonner depicts an industrial workhorse in HO scale

Operating siderods and smooth slow-speed performance highlight this HO scale General Electric 45-tonner industrial switcher. Part of Bachmann's Spectrum series, the HO 45-tonner features die-cast metal construction and a dual-mode Digital Command Control decoder that operates on DC and DCC layouts.

Prototype. General Electric built 475 45-ton switchers for North American customers in the 1940s and '50s. The 45-ton switcher was smaller and less expensive than GE's 44-ton switcher.

The 45-tonner had two traction motors that drove one axle of each truck. An internal chain-and-sprocket drive or external siderods connected to cranks transferred motion to the adjacent axles.

The HO model's dimensions match drawings in *General Electric Industrial Locomotives 1924-1978* (DPA-LTA Enterprises, Inc.).

Appearance and construction. The Bachmann 45-tonner is available mainly in unlettered

versions. The paint coverage on our sample is smooth and evenly applied. The yellow and white stripes on the hoods are straight, even where the stripes cross hood-access hatches.

The hoods of the model are a single piece of die-cast metal with well-defined molded detail. The cab and frame are plastic. The frame has molded safety tread detail on the walkways.

The cab interior features a single painted engineer figure and brake stand. Separately applied details include handrails, windshield wipers, and uncoupling levers.

The appearance of the plastic truck sideframes matches prototype photos. The axle-mounted cranks on each truck are connected by siderods that move with the motion of the wheels.

Mechanism. Removing the model's body shell is a bit more involved than the two steps indicated on the instruction sheet. To remove the shell, I first removed the couplers from the frame and the press-fit handrails from the locomotive cab.

► HO scale 45-ton switcher

Price: \$125

Manufacturer

Bachmann Trains

1400 E. Erie Ave.

Philadelphia, PA 19124

www.bachmanntrains.com

Road names: Bethlehem Steel no. 22. Painted but unlettered: Red with yellow stripes and handrails (pictured), black with yellow handrails, green with yellow handrails, yellow with black handrails

Era: 1940 to present day

Features

All-wheel drive and electrical pickup

Dual-mode DCC decoder

E-Z Mate Mark II operating knuckle couplers at correct height

Five-pole skew-wound motor
RP-25 contour blackened metal wheels in gauge

Weight: 4 ounces

Then I pulled off the press-fit trucks to expose all the screws holding the shell to the frame.

The plastic coupler pockets have plastic tabs that lock in place on each end of the body. Using a hobby knife I cut off the plastic tabs from each coupler pocket. Then I pulled

76 Atlas O DCC-sound-equipped GP7 diesel in O scale**78** M.T.H. Electric Trains HO scale 60-foot flatcar**80** Athearn N scale DCC-equipped F45

Blackstone Models HOn3 flatcar

82 Atlas N scale two-bay coal hopper

Summit HO Jack in the Box restaurant

Dana Kawala

each coupler pocket free and separated the body shell from the frame. (During reassembly, I used the now-modified coupler pockets without any difficulty.)

The can motor is enclosed in the center of a split die-cast metal weight. Two gearshafts transfer power to each truck gearbox.

The DCC decoder is mounted on top of the metal weight. This decoder measures $\frac{7}{16}$ " x $2\frac{1}{8}$ ". The press-fit plastic fuel tank on the bottom of the frame has a recess for a $\frac{1}{2}$ "-diameter speaker (not included) as well as sound holes.

Performance. The switcher ran smoothly on both a DC and DCC test track. The model sustained speeds of less than 1 scale mph without any jerkiness and accelerated to 35 scale mph, which is a bit higher than the prototype's 20 mph top speed.

Although the decoder supports only 28 speed steps and has limited motor-control programming capabilities, the 45-tonner started running at speed step 1. User-triggered DCC functions include turning the headlight on and off (Function 0) and dimming the headlight (Function 1). I changed the locomotive's address on a programming track using an MRC Prodigy Advance DCC system.

The headlights are constant light-emitting diodes. In both DC and DCC modes the headlights turn on and off according the model's direction of travel. I switched cuts of six 50-foot cars on our layout.

The Bachmann GE 45-tonner is a versatile choice for modelers looking to add industrial motive power to their HO layouts. — *Dana Kawala, associate editor*

Bachmann HO GE 45-tonner

Drawbar pull	64 ounces
	9 HO scale freight cars
Scale speed (DC)	Scale speed (DCC)
Volts	Speed step
2.5 (start)	0.4
6	1
9	1.1
12	14
	14
2.5 (start)	.4
6	1.1
9	1.4
12	35
Current draw at 12 volts (DC)	Slipping .14A
	Stalled .30A

► HO scale 44- and 70-ton switchers



Price: \$75 (44-ton), \$69 (70-ton)

Manufacturer: Bachmann Trains

Road names: 44 ton: Boston & Maine, Denver & Rio Grande Western, Pennsylvania. Painted/unlettered versions: Yellow with black stripes (pictured), black, green with yellow handrails. 70 ton: Bethlehem Steel, Louisville & Nashville, Southern Pacific, all two road numbers each. Painted but unlettered versions: Red (pictured), green, yellow and black.

Models of two other General Electric switchers are also available from Bachmann in HO scale. The HO General Electric 44-and 70-ton switchers, part of Bachmann's regular product line, include dual-mode Digital Command Control decoders.

Weighing in under the "90,000-pound rule of 1937" that protected fireman's jobs on diesel engines, a 44-ton locomotive could be legally operated by a single engineer. General Electric built the 44-tonner between 1940 and 1956.

The firm built the 70-tonner between 1946 and 1958 as a light-duty option for Class 1 railroads. However, this switcher, as well as the 44-tonner, proved more popular with short line and industrial customers. Both models' dimensions match drawings in the *Model Railroader Encyclopedia Vol. 2: Diesel Locomotives* (Kalmbach Publishing Co., out of print).

Construction and performance.

On both models, paint coverage on the plastic body shells is evenly applied. The acetal plastic handrails are separately applied.

To access the mechanism of each model, I removed the

couplers and fuel tank and then lifted the body shell off the die-cast metal chassis.

The Bachmann 44- and 70-ton switchers use a mechanism that's similar to the Spectrum series HO 45-tonner but not as smooth.

In DC the switchers started moving at less than 1 scale mph. Their 55 scale mph top speed is correct for a prototype 70-tonner, but higher than a prototype 44-tonner's 35 mph top speed.

In DCC, the models didn't start moving until speed step 7 at 3 scale mph. Both switchers lurched until speed step 10. At speed step 28 the models reached their 55 scale mph top speed.

Programming configuration variables (CVs) is limited with the Bachmann decoder. However, I improved the slow speed performance by setting the starting voltage (CV 2) to a maximum value of 255. The switchers then started moving smoothly at 2 scale mph in speed step 1.

These good-looking Bachmann switchers have enough power to haul trains in branchline, shortline, or industrial applications on an HO layout. — *D.K.*

Bachmann HO 44- and 70-ton GE switchers

Drawbar pull (44-ton)	.8 ounces 11 HO scale freight cars
-----------------------	---------------------------------------

Drawbar pull (70-ton)	1.3 ounces 18 HO scale freight cars
-----------------------	--

Scale speed (DC)	Scale speed (DCC)	Scale speed (DCC)	
Volts	Scale mph	Speed step	Scale mph
3.5 (start)	0.3	1	2
6	19	7	10
9	39	14	30
12	55	28	55

Current draw at 12 volts (DC)	Slipping 0.2A Stalled 0.4A
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Dual-mode DCC-equipped GP7 delivers smooth performance and realistic sound

Here's a brand new model of Electro-Motive Division's classic GP7 road switcher, and it's a beauty. It combines the utilitarian look of the prototype with a powerful mechanism that's suitable for nearly any assignment.

Manufactured by Atlas O, this well-detailed locomotive is offered ready-to-run with a factory-installed QSI sound decoder that operates on either DC or Digital Command Control (DCC). An unpowered version is also available.

The Electro-Motive Division's 1,500-hp GP7 was introduced in late 1949 and built until 1954. The Atlas O model has perforated skirting above the fuel tank that identifies it as what railfans call a phase II version. A total of 2,729 GP7 diesels were built by the time the GP9 was introduced. The model matches prototype drawings in the *Model Railroader Encyclopedia: Vol. 2, Diesel Locomotives*.

Appearance. The GP7 follows the excellent plastic and die-cast metal construction we've seen in other recent Atlas O models. Its body shell has a one-piece hood with a cab and dynamic brake assembly that snap into place. Various combinations of small detail parts are individually applied to match each prototype paint scheme.

The radiator fans are well done and include movable blades within the fan housings. All of the railings are formed wire mounted on properly shaped metal stanchions that simulate the prototype's bolted cast-steel fittings.

Painted crew figures are provided, but the view through the interior is masked to hide one of the motors. Both side windows operate and are fitted with wind deflectors. Sunshades are provided as user-applied parts.

The golden-white light-emitting-diode headlights automatically

switch from dim to bright in the direction of travel. A pair of classification lights in the upper corners of each end change to display green in the forward direction, which is correct only for a scheduled train with a second section following behind it. The lights to the rear change to red as marker lights. The number boxes are lighted at both ends.

Our sample GP7 came factory-painted in the Maine Central's Pine Green and Harvest Gold color scheme. Both colors were smoothly applied and all of the striping was perfectly aligned. The lettering was clearly printed and included appropriate EMD builder's plates and ownership trust plates on the frame edges.

Mechanism. The GP7's mechanism follows the same design Atlas O used on its previous GP9 (reviewed in the October 2005 MR). The chassis is die-cast metal, including the pilots and fuel tank, to give the unit a 4-pound, 2-ounce weight that helps it deliver plenty of tractive effort. All of the corner steps and footboards have fine see-through gratings, and the walkways and platforms include a realistic safety tread texture.

The rigid-frame GP ("Blomberg") trucks have detailed die-cast metal sideframes with the early outside brake hangers and individually applied brake cylinders, piping, and



Movable radiator fan blades, numerous scale-size rivets, see-through step tread, and textured running boards add to this GP7's realism.

swing hangers. The blackened nickel-silver RP-25 contour wheels match National Model Railroad Association standards.

Twin can motors fitted with brass flywheels power the locomotive. One motor is mounted vertically on each truck. All four axles are driven and all of the wheels pick up current. The DCC sound system and directional lighting components ride on printed-circuit boards mounted on top of the chassis. The hollow fuel tank contains a speaker for the sound system.

Dual-mode sound. The sound-equipped GP7 has a QSI Quantum sound system that offers plenty of volume and numerous specific sound choices. Dozens of adjustments are available to allow the user to choose and fine-tune whatever sounds he desires.

In DC the engine rpm sounds increased as I advanced the throttle. I also triggered the horn and bell using the power pack's direction switch. Many of the sounds can be adjusted with the power pack as outlined in the instruction manual. The QSI Quantum Engineer analog controller (sold separately) makes accessing and programming sounds on a DC layout easier.

In DCC the decoder supports 13 functions, including the bell, horn, and coupler crash. Function 9 triggers the heavy load feature, which keeps the locomotive speed constant while you manually increase or decrease the rpm sounds using the throttle.

Operation. Using the factory default settings, our sample GP7 began moving steadily at less than one scale mph on DC or DCC. It continued to run smoothly and quietly throughout its speed range. The dual-mode sound decoder uses quite a bit of current, so the DC top speed at 12 volts was only 32.7 scale mph. On DCC, the 83.9 scale mph is closer to the prototype Geep's maximum operating speeds between 55 and 89 mph.

The dual motors produce a 17-ounce drawbar pull that's equivalent to 52 free-rolling cars on straight and level track. However, the combined load of the sound

► Atlas O EMD GP7

Price: with dual-mode DCC sound system, \$469.95; unpowered units, \$209.95

Manufacturer

Atlas O LLC

378 Florence Ave.
Hillside, NJ 07205-1102
www.atlaso.com

Road names: (two road numbers) Atchison, Topeka & Santa Fe (silver zebra stripes); Lackawanna (black); Louisville & Nashville (black with cream); Maine Central (green); Pittsburgh & Lake Erie (NYC-style stripes); and Reading (black). Undecorated also available

Era: 1949 to present

Features

Twin can motors with flywheels
Dual-mode DC or DCC sound and control system
Eight-wheel drive and electrical pickup
Magnetic knuckle couplers mounted at the correct height
Minimum radius: 36"
Prototype-specific details
Weight: 4 pounds 2 ounces

Atlas O GP7

Drawbar pull	1.1 pounds 52 0 scale freight cars		
Scale speed (DC)		Scale speed (DCC)	
Volts	Scale mph	Speed step	Scale mph
8.2 (start)	0.96	1	0.98
9	6.0	7	18.7
10	16.4	14	40.9
12	32.7	28	84.0
Current draw at 12 volts (DC)	Slipping Stalled	1.5A 3.3A	

system and two powerful motors draws nearly 4 amperes.

This O scale Geep is a superb model of Electro-Motive's first road switcher. Its powerful mechanism and excellent finish make it an outstanding model. — *Jim Hediger, senior editor*

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Subscribers can watch a video of the Atlas O GP7 and the Athearn N scale F45. Go to our Web site at www.ModelRailroader.com.



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Flatcar in HO scale handles heavy loads

A nicely detailed reproduction of a 60-foot flatcar is M.T.H. Electric Trains' first entry into the HO scale freight car market.

The MTH car is based on a prototype Pullman-Standard built in the 1960s and '70s for Trailer

► HO scale 60-foot flatcar

Price: \$29.95; with load, \$34.95

Manufacturer

M.T.H. Electric Trains
7020 Columbia Gateway Dr.
Columbia, MD 21046
www.mthotrains.com

Road names: Atchison, Topeka & Santa Fe; BNSF Ry.; Burlington Northern; Canadian National; Great Northern; Southern Ry.; Trailer Train; and Union Pacific.

Era: 1964 to present

Features

Detailed brake equipment
Insulated, blackened-metal wheelsets, in gauge
Kadee-compatible magnetic knuckle couplers at correct height
Minimum operating radius: 18"

Norscot Caterpillar construction equipment load (also available without load)

Scale metal chain, wire tie-downs, and plastic load adjusters for securing load

Simulated wood grain deck
Sprung, die-cast metal trucks
Weight: 4 ounces with load (1 ounce too light by NMRA RP-20.1), 2 ounces without load

Train, and accurately matches photos and dimensions printed in the 1977 Simmons-Boardman *Car and Locomotive Cyclopedia*. Designed to haul agricultural machinery, construction equipment, and other such bulky vehicles, the flatcar has four channels down the length of its planked deck. Attachments can be secured in these channels to tie down a variety of loads. The model comes with a 15" length of scale chain and eight plastic simulated load adjusters for modelers who want to accurately model these tie-downs.

Our sample was painted Armour Yellow and decorated for the Union Pacific. The paint was smooth and even and the printing was crisp. Even the tiny white lettering in the black Clean Oil Test and Stencil (COTS) panel was legible under magnification. Well done!

The UP owned a 60-foot agricultural equipment flatcar bearing the number of our car; however, the

real no. 52084 was more than a foot narrower, according to the 1976 *Official Railway Equipment Register*. The MTH model more closely matches the dimensions of UP's car series numbered 52500-52599.

The car is lighter than the National Model Railroad Association's recommended practice, but that's to be expected for a flatcar, which has few places to hide weight. The load helps bring it closer to the recommendation.

The car is available with a die-cast metal Caterpillar hydraulic excavator, motor grader, or wheel loader. Ours came with an excavator, which has a two-piece movable scoop arm, clear cab windows, and a one-piece plastic tread assembly.

Flatcars give the modeler the ability to add interesting looking loads to their consists. The MTH car would be a great-looking addition to any HO scale freight car fleet from 1964 to today. — Steven Otte, associate editor



The model comes with scale metal chain, plastic load adjusters, and wire attachments to simulate tie-downs that locked into tracks on the deck.



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Product Reviews

► Athearn DCC-sound-equipped N scale F45



Price: \$199.98

Manufacturer

Athearn Trains

1550 Glenn Curtiss St.

Carson, CA 90746

www.athearn.com

Era: 1966 to 1990s

Comments: I reviewed the DC-only Athearn N scale F45 and FP45 in the February 2009 issue. This DCC version includes a dual-mode SoundTraxx Tsunami Digital Command Control decoder. The decoder and a single downward-facing speaker are on top of the split die-cast metal frame.

The F45 had the same speed performance and drawbar pull of

the DC version. However, in DC mode the F45 required 8 volts to start moving.

The 10 functions in DCC mode include a long and short whistle. You can program functions 9 and 10 for manual notching.

In DC mode, the bell rings as the model starts moving. A quick increase in track voltage triggers a grade-crossing signal, while a sharp decrease activates a squealing brake sound.

User manuals can be downloaded at www.soundtraxx.com.

With its many programmable features, this N scale F45 sounds as good as it looks. – D.K.

► Blackstone Models HOn3 D&RGW flatcar



Price: \$44.95

Manufacturer

Blackstone Models

210 Rock Point Dr.

Durango, CO 81301

www.blackstonemodels.com

Era: 1926 to 1942

Comments: A long-lived narrow gauge flatcar is the latest prototype modeled in HOn3 by Blackstone Models. Built in 1887, the car was part of the 6000-series and served on the three-foot-gauge lines of the Denver & Rio Grande (Denver & Rio Grande Western after 1923). Several were sold to the Rio Grande Southern in the late 1800s. Four still run on the Cumbres & Toltec RR.

Multiple road numbers are available with D&RGW lettering, representing prototypes that were rebuilt in the mid-1920s. An RGS

version is also available. The cars have a light weathering coat applied to the body.

All the model's dimensions match drawings of a 6000-series flatcar in Robert E. Sloan's *A Century + Ten of D&RGW Narrow Gauge Freight Cars, 1871 to 1981*. The frame is made of die-cast metal with a plastic deck. Brake rigging is separately applied.

The blackened metal 26"-diameter wheels are in gauge. Both Kadee no. 714 operating knuckle couplers are at the correct height.

The model weighs one ounce, which is 1.3 ounces too light according to National Model Railroad Association RP-20.1.

This accurately detailed flatcar is another great-looking HOn3 model from Blackstone. – D.K.

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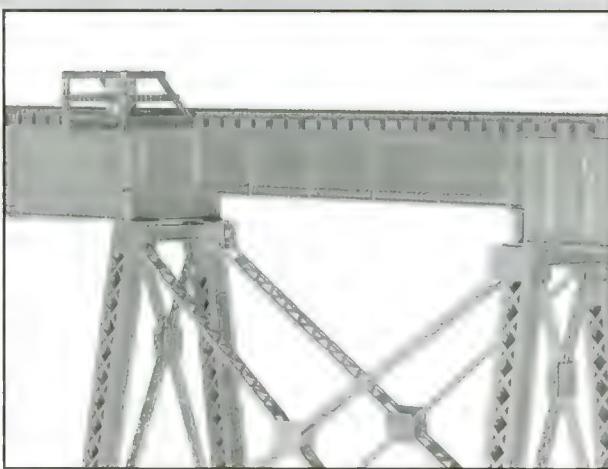
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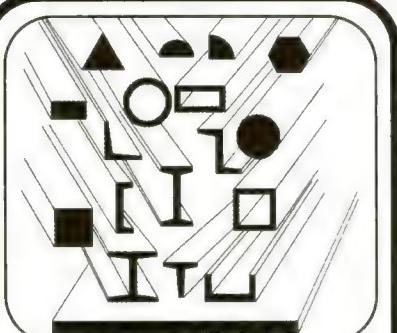
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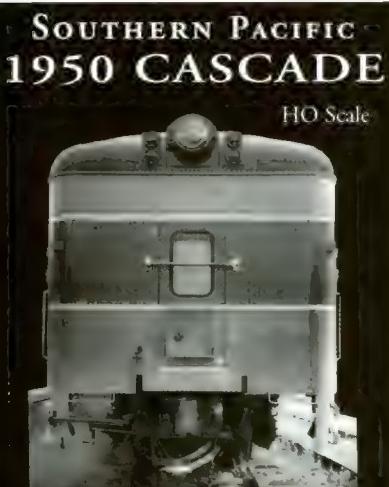
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Product Reviews

► Atlas N scale two-bay offset-side hopper

Price: \$16.95 (\$14.95 undecorated); three-pack, \$50.85

Manufacturer

Atlas Model Railroad Co.

378 Florence Ave.
Hillside, NJ 07205
www.atlasrr.com

Era: 1930s to 1980s

Comments: Based on a standard Association of American Railroads design, this coal hopper represents a prototype built throughout the 1930s and '40s. A handful lasted into the 1980s.

Our sample, an arched-end type, is a new model for Atlas, which previously issued a flat-end version. The car is available painted for the Chesapeake & Ohio, Clinchfield, Nickel Plate Road, and Montour, as well as undecorated. Two car numbers are available individually, as well as three more in a three-pack. Four more road names are offered in the flat-end version.



Our car's dimensions match those for the prototype in the 1940 *Official Railway Equipment Register*. The placement of the model's details and rivet patterns match photos in the 1940 *Car Builder's Cyclopedia*.

The lettering on our sample was crisp and clear. The car weighs .64 ounces, which is $\frac{1}{4}$ ounce too light according to National Model Railroad Association RP-20.1. The wheelsets were in gauge, and the couplers were mounted at the correct height.

A string of these cars would make an impressive solid coal train on an N scale steam- or transition-era layout. – S.O.

► Summit Models HO scale Jack in the Box

Price: \$69.95

Manufacturer

Summit USA LLC
512 Ford St.
Lake Charles, LA 70601
www.summit-customcuts.com

Era: present

Comments: Nothing says modern America like fast food, and now you can have a contemporary burger joint on your HO scale layout. Jack in the Box is a laser-milled styrene structure kit that includes drive-through menu boards, clear window glazing, and peel-and-stick signs. The structure's footprint is $3\frac{1}{2}'' \times 6'' \times 7\frac{1}{2}''$, but be sure to leave room for a parking lot and drive-through.

The kit has clear, photo-illustrated instructions. The manufacturer also provides a list of recommended paints, which I found helpful as there are no Jack in the Box restaurants nearby for color reference.

Generally, the kit is easy to assemble and requires a minimum amount of filing and sanding for



the parts to fit properly. However, I had to fill gaps and do some careful sanding to make the upper trim appear seamless. This kit is best suited for those with intermediate or higher modeling skills. An assembled and painted structure is available for \$235.

The kit also includes styrene cutting templates for the awnings and wall sign bases. These parts are all cut from the same sheet of supplied Plastruct metal siding.

With more than 2,100 stores in 17 states, Jack in the Box is a well-known restaurant chain. This structure was fun to build and would look good along a busy road on a modern-era layout. – Cody Grivno, associate editor



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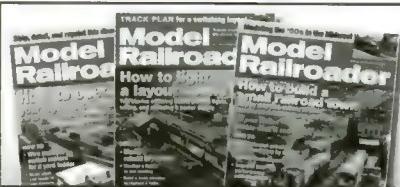
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Trackside Photos



A two-truck Shay stops at a water tank for a refill near the waterfall that gives the town of Granite Falls, Wash., its name. The scene takes place on an On2½ module built by Bill Orr, a member of the Suncoast Model RR Club in Largo, Fla. The water tank was scratchbuilt by fellow club member Rey Feldt, and the waterfall and river were made by Jon Addison. Lou Sassi photo



Want to see your work in Trackside Photos?

Trackside Photos is a showcase for the work of *Model Railroader* readers. We encourage contributions. Send your photos (original color slides or digital images 5 megapixels or better on CD-ROM) to: *Model Railroader*, Trackside Photos, P.O. Box 1612, Waukesha, WI 53187-1612. Include caption information, such as a description of what's going on in the picture; the name, scale, era, and locale of the layout; and information about the rolling stock or structures pictured. For a copy of our photo submission guidelines, contact editorial associate Eric Stelplug at 262-796-8776, ext. 583, or mrmag@mrmag.com.



Chicago & North Western no. 5005A leads the *Cornbelt 400* around a curve on Stan Olander's HO scale Cornbelt Northern RR. Stan, of Elm Grove, Wis., plans to open his railroad for tours during the 2010 National Model Railroad Association convention in Milwaukee, Wis. Dave Rickaby photo

More on our Web site

Dave Rickaby's photo of Stan Olander's HO scale Cornbelt Northern RR, above, is our free downloadable computer wallpaper this month. Get it at www.ModelRailroader.com.

Trackside Photos



Southern Pacific no. 2798 approaches a scratchbuilt plate girder bridge on Bill Young's S scale layout in Mount Shasta, Calif. The locomotive is from Southwind Models, and Bill built the trees with materials by Bragdon Enterprises. Joe

Visintine photo



Charlie Purin of Pewaukee, Wis., combined his love of ships and trains to scratch-build this O scale model of the Great Lakes railroad ferry *Sainte Marie*, including the approach and counter-weighted apron at St. Ignace, Mich. Charlie says the 8-foot-long module took 3½ years to research and build. Tom Houle photo



A Consolidation descends a steep cliff in the Rockies on Anthony Richter's HO scale Denver & Rio Grande Western layout. Anthony, who lives in Spearfish, S.D., built the locomotive from a Bowser kit, made his own molds for the rocks, and also took the photo.

What visitors come to see

Tony Koester



Recent work on Tony Koester's Nickel Plate Third Subdivision includes laying track in this yard at Charleston, Ill. Tony discusses this project in *Model Railroader's* special issue, *Building Realistic and Reliable Track*, which will be on sale in August 2009. Tony Koester photo

In the March 2009 *Model Railroader*, I wrote about the etiquette that we should observe when visiting a layout. On this occasion, I'd like to look at the other side of the coin: visitor expectations. To wit, when do we deem our layouts ready for visitors – not the local work group but perhaps total strangers, a local club, or a National Model Railroad Association division or special-interest group?

To my surprise, more than one layout builder participating in an online chat group said he would be mortally embarrassed if a casual visitor saw his layout before it was finished, right down to the scenery and structures. A club member told me that his club thinks their layout "has to be finished in record time, since we have visitors dropping by at regular intervals."

If the reason we open the doors to visitors is a public show, perhaps during National Model Railroad Month, then I fully understand this quest to put our best foot forward. Mom, Pop, and Junior may not be impressed with an expanse of open benchwork.

And some of us are more theater majors than engineers. To students of the theater, building a model

railroad is more like staging a play than re-creating the business of workaday railroading. Visitors, like an audience, view the work rather than participate in the production.

But for fellow model railroaders, I believe the sooner we open the doors to let them share our building pride and joy, the sooner we will all benefit. They'll get to see what we're doing, and we will gain from their observations. I've found that modelers are as interested in the underpinnings of my layout as they are in the finished product. I get countless inquiries about the multi-deck benchwork, lighting, wiring, and so on, all of which is easier to see at an early stage.

I also think our first goal – long before much finished scenery is in place – should be to get the railroad operating reliably and realistically. No matter how many test runs we make, it's only when the gang shows up to put the railroad through its paces that the more serious deficiencies (and potentially even their fixes) will make themselves known.

For example, at this writing I'm laying the track in the Charleston, Ill., division-point yard and engine terminal. Up till now, trains have

simply bypassed this yard and headed directly into or out of west-end staging. Charleston is fully 68½" (nearly 6 feet) above the floor, which caused two concerns: ease of construction and ease of operation.

The yardmaster and hostler will work in an alcove with a raised floor to ease the height concerns. I also added a narrow, raised platform along the edge of the yard and engine terminal that the yardmaster or hostler can use to step up briefly to uncouple a car or check the alignment of a switch.

Despite the yard still being a construction zone, I asked my operating crew to "try it out" – pretend they were attempting to work up there. The answer was quick: The ledge is too narrow. "It's just a step," I countered. "For you, maybe. For those of us who are not six-footers, it'll be a working platform!" I therefore spent several hours moving the ledge out about 3".

Over the years, a number of similar suggestions have pointed me toward improvements. Some suggested solutions were utterly impractical, but they still let me know that a problem existed. Others, like moving the ledge, were a pain, but better than kind of pain than one caused by someone falling off a narrow step.

It's hard to admit that someone could walk into my basement, spend maybe 30 minutes looking at a railroad that has been front and center in my life for almost a decade, and spot something I'd missed. It's a humbling experience.

Either way – as an operator or a viewer – the visitor's experience will, in my view, be enhanced if he can see the entire production process from beginning to end. To be sure, I'm not going to deliberately leave part of my layout unfinished as Construction Exhibit A. But I should be eager to share the layout with visitors sooner rather than later. **MR**

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Want to learn more about recent progress on Tony Koester's HO layout? Watch an interview with Tony at www.ModelRailroader.com.



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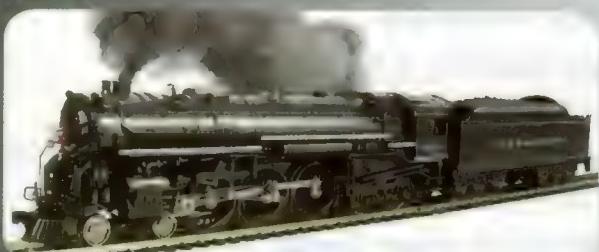
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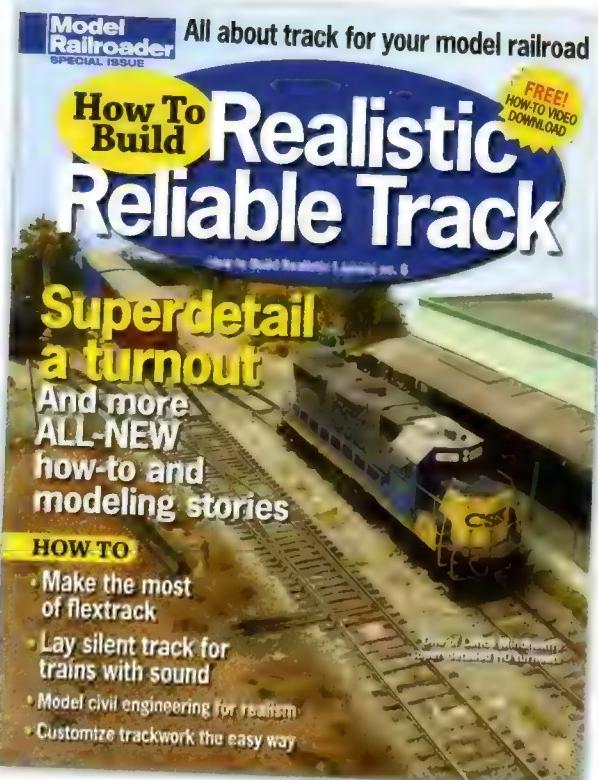
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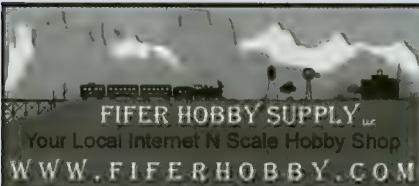
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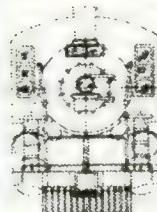
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CLOSING DATES: Jan 2009 issue closes Oct. 17, Feb. closes Nov. 18, Mar. closes Dec. 16, Apr. closes Jan. 16, May closes Feb. 16, June closes Mar. 20, July closes Apr. 17, Aug. closes May 15, Sept. closes June 18, Oct. closes July 17, Nov. closes Aug. 18, Dec. closes Sept. 18.

Note to Readers: Show dates, times and locations sometimes change. Confirm the details before driving any distance. Please go to www.mrrmag.com and click on the **Schedule of Events** section to get more complete information on these and other coming events.

Schedule of Events

AZ, PHOENIX: "IN THE HEAT" SWAP MEET North Phoenix Baptist Church, 5757 N. Central Ave. Sponsored by Roundhouse Rats. Saturday, July 25th, 2009, 9:00am-1:00pm. Adults \$5.00. All gauges, books, tapes, train rail memorabilia, accessories. Handicap accessible, good food. More information contact David Jerry 602-361-0356.

DE, HARRINGTON: 1ST ANNUAL TRAIN AND TOY SHOW. Sponsored by the Harrington Parks and Recreation, 114 E Liberty Street. Saturday August 29th, 2009 from 9:00 am - 4:00 pm. Admission \$2 - adults, children under 12 - FREE. Contact: Bill Falasco, 302-398-7975. E-mail: bfalasco@cityofharrington.us

FL, THE VILLAGES: RAILROAD HISTORICAL SOCIETY MODEL TRAIN SHOW & RAILROADIANA SHOW & SALE. Colony Cottage Recreation Center, corner of Morse Blvd. and CR 466A, August 22-23, 2009. Saturday 10:00am-4:00pm, Sunday 10:00am-3:00pm. Admission \$5.00, children under 12 free w/adult. Contact Alan Goldberg 352-205-4322, e-mail: amgold15@hotmail.com

GA, ATLANTA: 37TH ATLANTA MODEL TRAIN SHOW North Atlanta Trade Center, 1700 Jeurgens Court, Norcross, GA. Saturday, August 8, 2009, 9AM to 4PM. Adults: \$7.00 (under 12 free). Operating layouts. 300+ tables. Miller, 3106 N. Rochester St., Arlington, VA 22213 703-536-2954. E-mail: rrshows@aol.com

IN, CROWN POINT: CROWN POINT MODEL RAILROAD SHOW & SWAP MEET St. Matthias Church Hall, 101 Burrell Dr. Sunday, October 25, 2009, 10:30am-3:00pm. Adults \$3.00, children \$1.00. Buy, sell, all gauges trains, operating layout. Wheelchair accessible. Contact: Tom 219-663-4480 or Bruno 219-663-0666

KS, LENEXA: NMRA TURKEY CREEK SHOW. Lenexa Community Center, 13420 Oak St. August 1, 2009, 9:30am - 3:30pm. \$6; under 12 free; in advance \$5. 80+ vendors, clinics, displays & door prizes. Info and registration form: l-seibel@comcast.net; Tables S15; Robert Jefferis, jeffbob@everestkc.net or visit: <http://www.tc-nmra.org>

MO, KANSAS CITY: 2ND ANNUAL TRAIN FAIR Union Station, 30 W Pershing Road. September 26-27, 2009. Saturday 9:00am-5:00pm, Sunday 10:00am-4:00pm. Admission: \$7, 11 and under FREE. Special events for kids. Call 816-460-2020 or visit: www.unionstation.org for more information.

NE, NORTH PLATTE: "RAIL FEST" September 18, 19, & 20, 2009. America's premier railroad event! Tour the world's largest railroad yard and visit the Golden Spike Tower for an aerial view of Bailey Yards. Visit: www.nprailfest.com or call 308-534-3648.

OH, FOSTORIA: RAIL FESTIVAL & TRAIN SHOW. September 19th, 2009. Saturday 10-4. Fostoria Town Center & Fostoria Middle School. Bus shuttles between venues. Model train displays, historic rail tour, photo contest, soup contest and more. Free admission. Visit: www.FostorialIronTriangle.com; or call 419-435-1781

TX, NEW BRAUNFELS: SUMMER MODEL TRAIN SHOW

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VA, VIRGINIA BEACH: TIDEWATER DIVISION'S 20TH ANNUAL TRAIN SHOW AND SALE

Virginia Beach Convention Center, 1000 19th Street, September 19-20, 2009, 10:00am-4:00pm both days. Admission: \$7.00/children under 12 free w/adult. Operating trains (various gauges), test tracks, train doctors. Info 757-426-2811, E-mail nawneycreek@msn.com Flyer: <http://nrma-mer-tidewater.org> Map: <http://virginiabeachconventioncenter.com>

WI, MONROE: GREEN COUNTY MODEL RAILROADERS INC. 31ST ANNUAL TRAIN SHOW AND SWAP MEET.

State Line Ice and Community Expo, 1632 4th Avenue West, Saturday & Sunday, September 26th & 27th, 2009, 10:00am-4:00pm. For information contact Paul Schoenike 608-325-9491.

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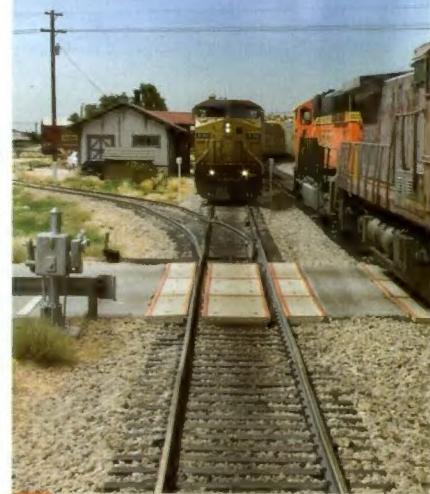
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The Operators

Andy Sperandeo



The lower-quadrant train order signal for westward movement is in its down, or "proceed," position as the Santa Fe's westbound *El Capitan* makes a station stop in Pasadena, Calif., on July 11, 1946. Santa Fe photo

Train order signals – part 1

Train order signals are not only interesting lineside details, they can serve a prototypical purpose in model operations. This month I'll explain some basic facts about these signals, and next time I'll present some considerations about using them on model railroads.

Where they should be. Train order signals are installed at any office of communication where a train order operator is assigned to receive orders from the dispatcher for transmittal in writing to train crews. That can include stations, interlocking towers, and small buildings designated "cabins," "offices," or "towers," used solely by train order operators.

An important exception is a station at the initial terminal of any subdivision or crew district. There every train receives at least a clearance card (often but not always called "Clearance Form A") if not train orders as well. Thus there's no need for a signal.

Other exceptions may be a station where there's no operator, such as a stop on a commuter train route. At a manned interlocking tower where one railroad crosses

another at grade, the signalman might also work as an operator for the line that runs the tower, but not for the other road. In that case there's no train order signal for the latter railroad at that tower.

Train order signals typically aren't used on lines operated by signal indication under Centralized Traffic Control. Controlled signals instead of written orders convey authority and restrictions.

Train order signals are used on lines protected by automatic block signals, whether single or multiple track. Automatic signals are primarily a safety and train-spacing system, and movement authority still comes from the timetable as modified by train orders.

Signal indications. The "classic" train order signal is a double semaphore with blades and spectacles facing in either direction. The semaphore may be either "upper quadrant," operating through an upward 90-degree arc, or "lower quadrant," operating through a downward arc.

In both types the horizontal position, with a red light at night, indicates "stop, unless clearance

card received." (Train orders or messages are always delivered with a clearance, and the clearance alone may be delivered if the signal is displayed for another train in the same direction.)

The full up or down position, with a green light, indicates "proceed, no orders." If a third position is used, it's 45 degrees up or down with a yellow light, indicating "proceed under clearance or train order and clearance" (the clearance and orders are set to be picked up from the moving train).

The governing blade of the double semaphore is the one extending to the right as seen from an approaching train. The other blade is significant only to trains in the opposite direction. If a railroad also uses semaphores for block and interlocking signals, the blades of its train order semaphores may be a different color or have a differently shaped end, or both.

Other types of signals. An older kind of train order signal was the paddle or banner signal. A horizontal paddle, usually painted red, hung from a vertical shaft on a bracket extending from the station, tower, or office. A four-lens lantern like a switch lantern was mounted on top of the vertical shaft.

In the "stop" position the paddle was perpendicular to the track, and the lantern's red lenses faced both ways along the line. In the "proceed" position the paddle was edge-on to approaching trains, and the green lantern lenses faced both ways along the track.

Some rule books allowed a third indication with a paddle signal. A yellow flag, or yellow lantern at night, displayed with the red signal, indicated "proceed under clearance or train order and clearance."

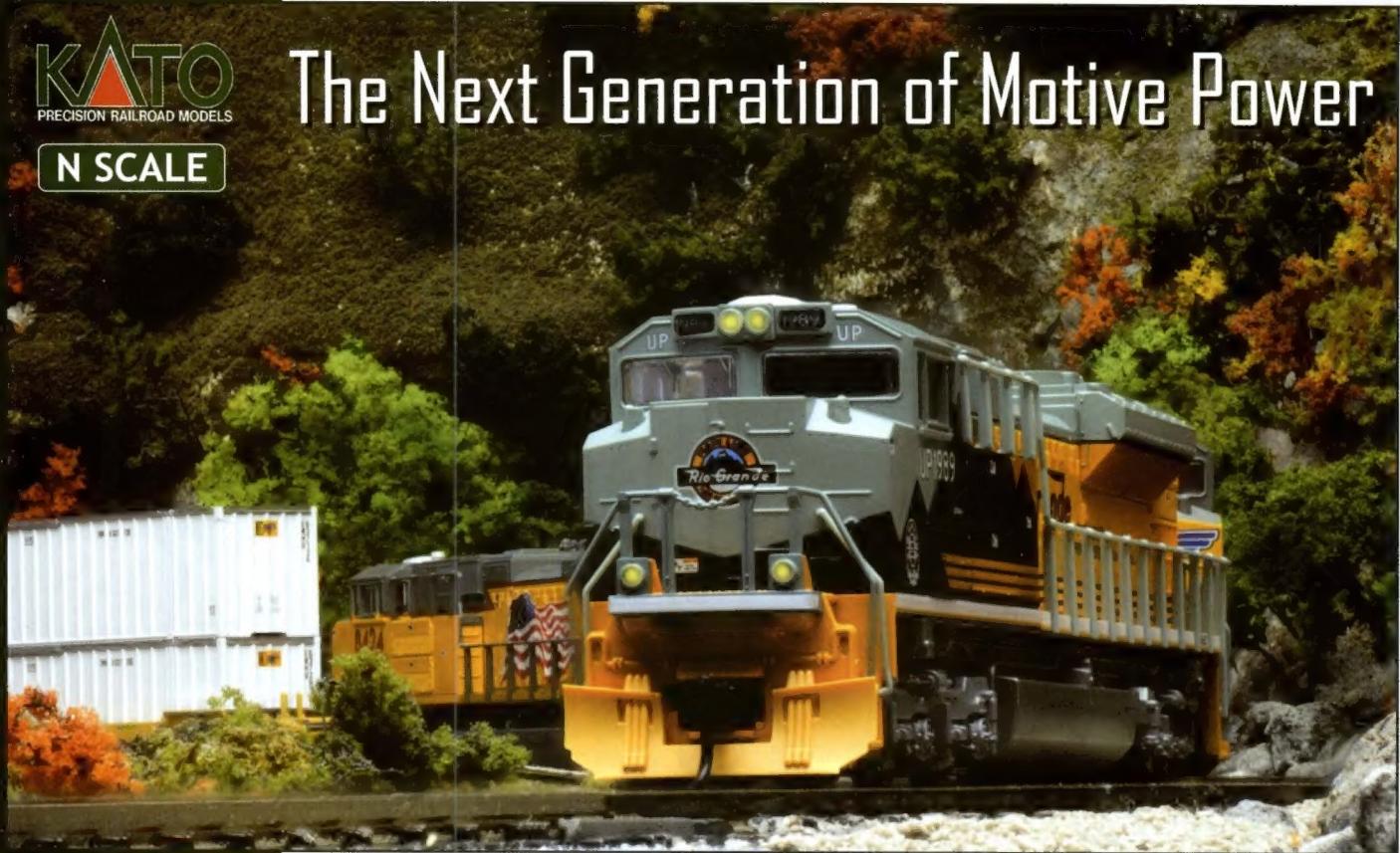
Color-light signals much like block signals were used in more modern applications. The colored light might flash to distinguish it from steady-aspect block signals.

The Web site at <http://mysite.du.edu/~etuttle/rail/to.htm> shows several types of train order signals. Next month I'll look at using these signals in model operation. **MR**



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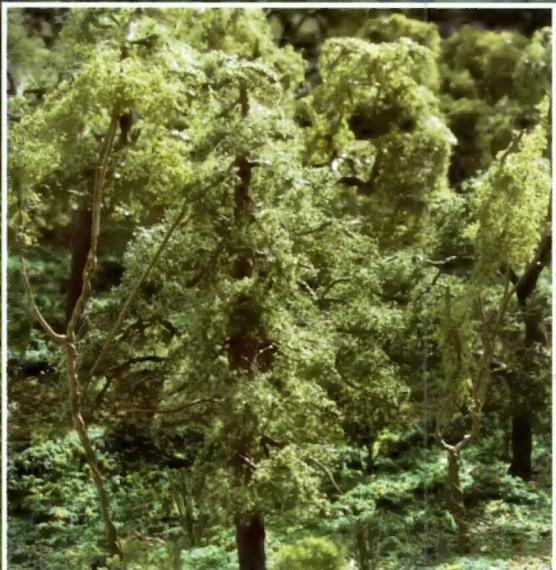
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